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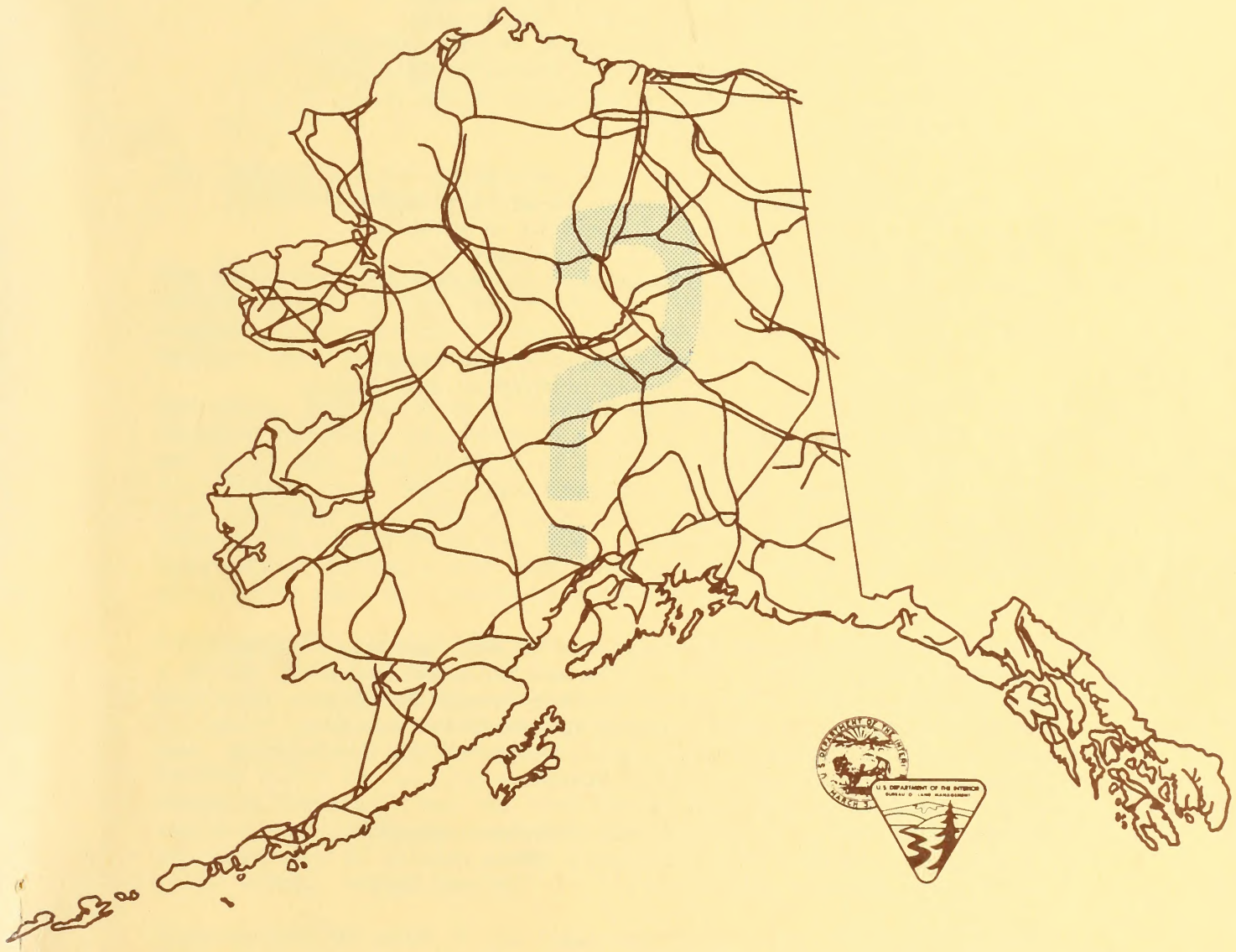
Pt. 1

Multimodal Transportation & Utility Corridor Systems In Alaska



A Preliminary, Conceptual Analysis

OCTOBER 1974

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Land Management
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lands not be involved and there is no apparent alternative routing; or where the Congress determines that corridors or rights-of-way not cross proposed additions to the national park, forest, refuge and wild and scenic rivers systems and there is no apparent alternative routing. The advice of the Joint Federal-State Land Use Planning Commission will have a significant bearing upon the final decisions.

It is urged that the State and the Joint Federal-State Land Use Planning Commission hold public hearings to obtain wide public input into the development of a comprehensive, multimodal, statewide transportation system for Alaska. This would be a continuation of the initial efforts of the Commission hearings held throughout the State last spring. The Bureau stands ready to assist should public hearings be deemed desirable.

Detailed information on the suggested corridors is on file in the State Office, Bureau of Land Management, 555 Cordova Street, Anchorage, Alaska 99501.

Sincerely yours,

Curt Berklund

Director

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Director, Bureau of Land Management

DATE: October 24, 1974

In reply refer to:
2800 (914)

FROM : State Director, Bureau of Land Management, Alaska

SUBJECT: Initial identification of a Primary Corridor System, Alaska

The enclosed study has been prepared in response to Instruction Memo 74-299 dated August 2, 1974. It outlines the urgent need for identification of a statewide transportation system for consideration in:

1. Making reservations for public access across lands being transferred into private Native ownership under the provisions of the Alaska Native Claims Settlement Act (PL 92-203);

2. Development of a rational plan for movement of high value energy resources from remote areas of Alaska which minimizes adverse environmental impacts and to prevent the proliferation of separate rights-of-way in accord with the principles established by Title I of the Mineral Leasing Act of 1920, Amendments and Trans-Alaska Oil Pipeline Authorization (PL 93-153);

3. Assessment of the need for a national system of transportation and utility corridors across Federal lands in accord with the provisions of Title I, PL 93-153;

4. Assessment of potential routes through Alaska for construction of pipelines and other transportation systems for the movement of natural gas and oil from Alaska through Canada to markets in the conterminous United States in studies required by Titles II and III of PL 93-153, and;

5. Preparation of the joint environmental impact statement by the Department of the Interior and Federal Power Commission, evaluating applications by the Alaskan Arctic Gas Pipeline Company and the El Paso Alaska Company to transport natural gas from the Prudhoe Bay Field.

Initial identification takes into account anticipated future development of Alaska for other minerals, wildlife, fish, agriculture, timber, scenic, recreational and historic resources in balance with equally high public values for preserving unique natural and primitive aspects.

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An essential concern interwoven throughout our considerations is to provide an environment which will sustain the "Alaskan" way of life.

Primary corridors suggested in this report have been made without regard to existing or prospective land and resource ownership. Identification has been made on the basis of data assembled by the Joint Federal-State Land Use Planning Commission and other Federal, State and University studies. Each corridor has been carefully tested against planning assumptions and location criteria. However, present information is not adequate to determine the magnitude of the social, economic and environmental impacts of these corridors. Such a detailed evaluation, in accord with the provisions of the National Environmental Policy Act (PL 91-190), will be done whenever Federal approval is requested to construct a transportation mode or utility within a corridor.

The study has been conducted by an interdisciplinary team of Bureau employees with the full time assistance of a transportation planner from the Department of Transportation, Federal Highway Administration (FHWA), and part time assistance of planners from both FHWA and the Federal Aviation Administration. We have actively sought the advice of all knowledgable Bureau employees in Alaska and have obtained assistance from the Bureau of Mines and Alaska Power Administration. Preliminary comments from the Geological Survey, Bureau of Indian Affairs, National Park Service, and Fish and Wildlife Service are reflected. We have consulted the Forest Service and Bureau of Outdoor Recreation. We stress, however, that careful review by the public, State, Joint Federal-State Land Use Planning Commission, local governments, Natives, and concerned Federal agencies is required. Additional information has already been sought from the State.

It is my recommendation that:

1. The enclosed report be sent to the State of Alaska and Joint Federal-State Land Use Planning Commission requesting comments and public hearings.

2. Subject to the receipt of comments from the State of Alaska, Joint Federal-State Land Use Planning Commission, local governments, Natives, public and concerned Federal agencies the suggested Primary Corridors be considered as <u>interim</u> locations.

3. The suggested Primary Corridors be considered for public easement reservations in interim conveyances of approximately 44 million acres of public lands to Alaskan Natives under the provisions of the Alaskan Native Claims Settlement Act.

4. The suggested Primary Corridors be an initial basis for working with the Congress and the State of Alaska to adequately accommodate statewide transportation and utility requirements and determining the best location for rights-of-way and corridors, should such be required, to cross the proposed addition of 83 million acres of public lands in Alaska to the national park, refuge, forest and wild and scenic rivers systems.

5. The interim conveyance documents should stipulate that easement reservations will be modified or terminated, if:

   (a) Congress determines that no easements are to be reserved on National Interest Lands (d-2).

   (b) The State determines that no easements are to be reserved on land under its jurisdiction.

6. The suggested Primary Corridors be considered in the preparation of the environmental impact statement evaluating pending applications to the Department of the Interior and the Federal Power Commission to transport natural gas from Prudhoe.

7. All corridors should be reviewed at least every five years to determine if still needed, or if they should be relocated, terminated, or modified.

We stand ready to provide assistance to the Joint Federal-State Land Use Planning Commission and the State of Alaska should either or both deem it desirable to hold public hearings. We will make special efforts to consult Native villages and Regional Corporations.

Curtis V. Lee

Enclosure 1
Encl. 1 - Primary Corridor System, Alaska

I concur:

Curt Berklund

Director, Bureau of Land Management

PRIMARY CORRIDOR SYSTEM, ALASKA
INITIAL IDENTIFICATION

FOREWORD

This report addresses a critical question seldom encountered in planning:

> How best to identify individual and multimodal transportation corridors in a large undeveloped land mass on the eve of exceptionally rapid change?

There has been, and may always be, decided opinion on the merits of individual transportation routes and modes in Alaska. Frequently, concern is expressed that routes or corridors are improperly located, or unnecessary. Development of transportation brings people into sparsely populated areas where residents have great dependence on the land for subsistence. Some contend that easements should be purchased from land owners. Others point out that the latent value of undeveloped land and resources will not be realized by its owners without reasonable assurance that people, goods and products can be transported to and from origin and market.

These considerations must be weighed against present and future national and State energy and mineral supply needs, and the national and State objective of preserving the rich Alaskan culture and simultaneously assure that outstanding scenery, wildlife, fisheries and wild areas are both preserved and accessible.

The proposals in this report represent planning concepts and processes to assist in the development of a comprehensive land use plan, rather than an inflexible transportation system.

A conscious effort has been made to provide alternative choices wherever possible. The data presented are based upon an interdisciplinary approach to transportation planning and the best available data from a variety of sources. The report is preliminary in nature, yet should provide a useful framework for public discussion and further detailed study.

DEFINITION

The Primary Corridor System is defined as a network of corridors intended for the systematic transport of high-value, energy-related resources from their point of origin to processing or transshipment points in other regions of the State. The network is intended to identify transportation routes for resources of national or state-wide significance. It is analogous to the transportation network that already exists in conterminous states consisting of navigation, highway, railroad, and pipeline.

The Primary Corridor System provides for relatively high volume movement of bulky goods over long distances. The system does not replace, but rather supplements, the air mode throughout the State as well as expansion of the existing intermodal surface transportation and utility system in Alaska. Similarly, it is a logical starting point in assessing local considerations on public access needs.

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SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Transportation throughout much of Alaska is not adequate for anticipated needs in the immediate future. There is no comprehensive, multimodal transportation and utility corridor plan to meet these needs.

Land uses in Alaska are on the eve of exceptionally rapid changes as:

-- The quest accelerates to find, develop and export Alaska's large energy resources.

-- Approximately 44 million acres of public lands in Alaska are transferred to the ownership of Alaska Native village and regional corporations.

-- The transfer of 104.5 million acres of land from Federal to State ownership is completed in accord with the Alaska Statehood Act and other laws.

-- Congress acts on recommendations of the Secretary of the Interior that 83.47 million acres of public land in Alaska be added to the national park, forest, wildlife refuge and wild and scenic rivers systems.

Transfer of lands selected by Alaskan Native village and regional corporations is ongoing, with major emphasis on expeditious transfer of land to Native ownership. This transfer causes a daily, piecemeal shaping of the future scope and location of surface transportation and utility corridor needs throughout Alaska.

Lands available for selection by Alaskan Natives and the proposed additions to the national park, forest, wildlife refuge and wild and scenic rivers systems comprise approximately one-third of the surface area of Alaska. Adequate transportation and utility corridors cannot become reality without crossing at least some Native-owned lands and some proposed additions to the four national conservation systems.

Intensive study by the Joint Federal-State Land Use Planning Commission, State, Alaskan Natives, and various Federal agencies has provided general information on the regional location of energy, mineral, forest, scenic, wildlife, subsistence, soils vegetation, fisheries, wilderness, agriculture and related values.

We are now confronted with land use decisions which, in the case of lands proposed for addition to the national park, forest, wildlife refuge and wild and scenic rivers systems, will impose specific legislative and administrative constraints on the future of surface transportation and utility transmission systems in Alaska.

Initial identification of a Primary Corridor System is a step in determining overall state-wide land uses. It is therefore argued, with considerable merit, that it is first necessary to develop a comprehensive state-wide land use plan; then, after additional study reflecting local, State, national and international needs, to devise a transportation and utility system. However, the precise nature, location and magnitude of energy reserves in Alaska is unknown. While no exact plan can be prepared to develop and export energy from areas with most significant oil, gas, coal, geothermal, or hydroelectric potentials, there is now sufficient information to begin to answer the question:

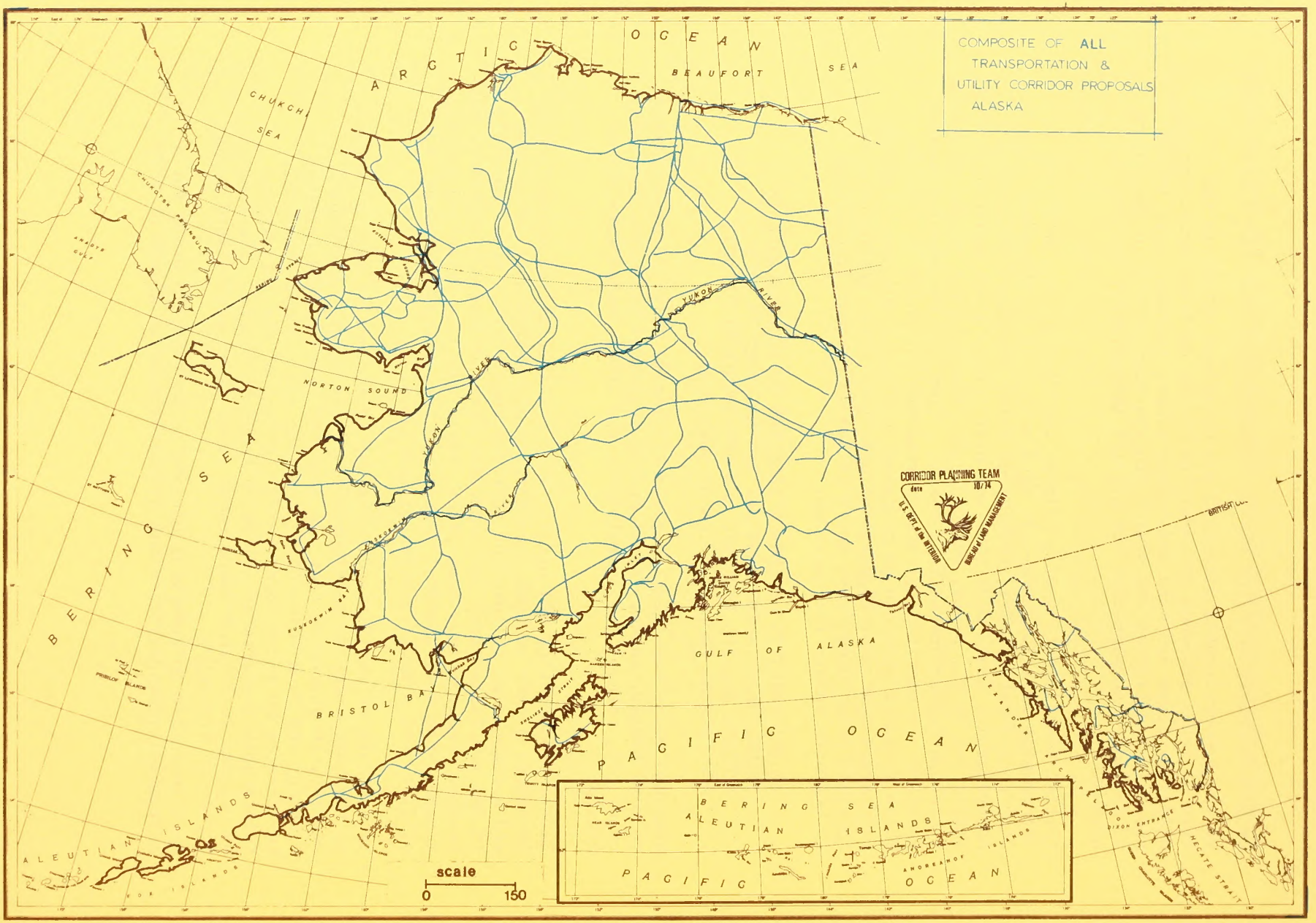
> IF THE QUANTITY OF ENERGY BELIEVED TO BE AVAILABLE IS THERE, WHAT IS THE BEST WAY TO TRANSPORT IT WITH MINIMUM SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPACTS AND PREVENT PROLIFERATION OF CORRIDORS?

Numerous plans have been proposed to improve existing capabilities to move people, goods, forest and agricultural products, minerals, crude oil, natural gas, electricity and other commodities within Alaska.

Each transportation and utility plan has special requirements for location; a need to keep construction and maintenance costs low; and a compulsion to take the shortest, most direct route possible. If the resulting plans for separate, often divergent, rights-of-way between common points took place, there would be maximized social, economic and environmental impacts on the existing "Alaskan" way of life, and a proliferation of corridors.

The quality of available data is not sufficient to make a judgment on the best modes or best specific routes. Data is adequate, however, to determine that the existing trans-Alaska pipeline corridor and Cook Inlet/Gulf of Alaska area cannot reasonably be expected to serve more than 34 percent of the anticipated recoverable deposits of oil to be found in Alaska. The remaining 66 percent is located where today there is no established transportation system.

An alternative to reserving options to meet future needs for a multimodal transportation and utility system in Alaska at this


COMPOSITE OF ALL
TRANSPORTATION &
UTILITY CORRIDOR PROPOSALS
ALASKA
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
CHUKOTSK PENINSULA
KOTZEBUE SOUND
NORTON SOUND
YUKON RIVER
YUKON
KUSKOKWIM BAY
BERING SEA
PRIBILOF ISLANDS
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
FOX ISLANDS
BRITISH
CORRIDOR PLANNING TEAM
date 10/74
U.S. DEPT. of the INTERIOR
BUREAU of LAND MANAGEMENT
scale
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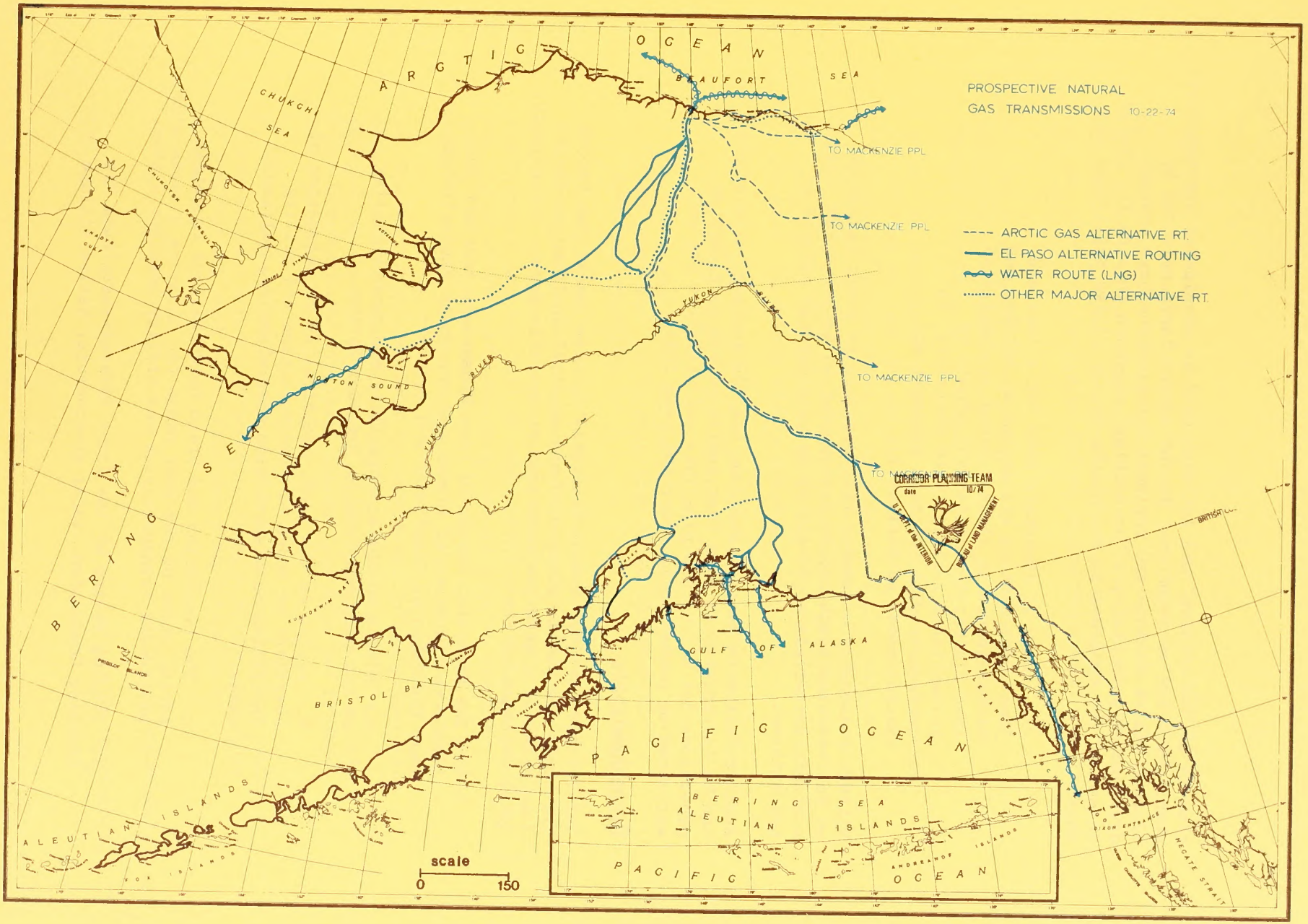
150
BERING SEA
ALEUTIAN ISLANDS
PACIFIC OCEAN
ANDREANOF ISLANDS


PROSPECTIVE NATURAL
GAS TRANSMISSIONS 10-22-74
ARCTIC GAS ALTERNATIVE RT.
EL PASO ALTERNATIVE ROUTING
WATER ROUTE (LNG)
OTHER MAJOR ALTERNATIVE RT.
TO MACKENZIE PPL
TO MACKENZIE PPL
TO MACKENZIE PPL
CORRIDOR PLANNING TEAM
date 10/74
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
BERING SEA
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
scale
0
150

time is to "do nothing" and let each need be considered spontaneously when, where and as required. To the extent lands selected by Alaskan Native village and regional corporations have economic development potentials, a "do nothing" approach thwarts the stated intent of the Congress in the Alaska Native Claims Settlement Act that:

> .... there is immediate need for a fair and just settlement of all claims by Natives and Native groups in Alaska, based on aboriginal land claims; the settlement should be accomplished rapidly, with certainty, in conformity with the real economic and social needs of Natives ....

Without reasonable assurance that minerals or other resources on Native-owned lands can be transported to market areas, their economic potentials would either be considerably reduced or non-existent.

Another factor to be considered in the "do nothing" alternative can be interpreted to mean that public access corridors or provisions for oil or gas pipelines and utilities are not warranted or needed until after the year 2001.

Recommendations

The Primary Corridor System described in this report can become the basis for public discussion and eventual decision as large land areas of Alaska are committed to specific uses. Accordingly, it is recommended that:

1. The Director, Bureau of Land Management transmit this report to the State of Alaska and the Joint Federal-State Land Use Planning Commission and request:

    a. Advice on the acceptability and practicability of the proposed Primary Corridor System.

    b. Advice on the need, modification or relocation of corridors or modes of transportation and utility facilities on a state-wide comprehensive, multimodal basis.

    c. The Commission and State hold hearings to obtain public views on the best means for locating a state-wide, multimodal transportation and utility corridor system.

2. Pending review by the Joint Federal-State Land Use Planning Commission, local governments, Native village and

regional corporations and the public, the initial identification of a Primary Corridor System described in this report be used as a basis for considering public easement requirements across lands being conveyed to Native village and regional corporations in accord with the provisions of Section 17(b) of the Alaska Native Claims Settlement Act (P.L. 92-203).

3. The interim conveyance documents transferring land ownership to Alaskan Natives stipulate public easement reservations will be terminated or modified:

a. If the State of Alaska determines that a particular corridor or mode should not cross areas owned by the State and where there is no reasonable alternative location; or if the Congress determines that a particular corridor or mode should not cross areas proposed for addition to the National park, forest, wildlife refuge or wild and scenic rivers systems.

b. If future determinations are made that a particular corridor or mode is not needed.

c. With selection and use of a single corridor or mode when there are one or more identified alternative locations or modes.

4. The suggested Primary Corridor System be the initial basis for working with the Congress and the State of Alaska to adequately accommodate state-wide transportation and utility requirements and for initial determination of the best location for rights-of-way and corridors, should such be required, across the proposed addition of 83.47 million acres of public lands in Alaska to the four national conservation systems.

5. The suggested corridors be considered in the preparation of environmental impact statements evaluating pending applications to the Department of the Interior and Federal Power Commission to transport natural gas from the Prudhoe Field of Alaska.

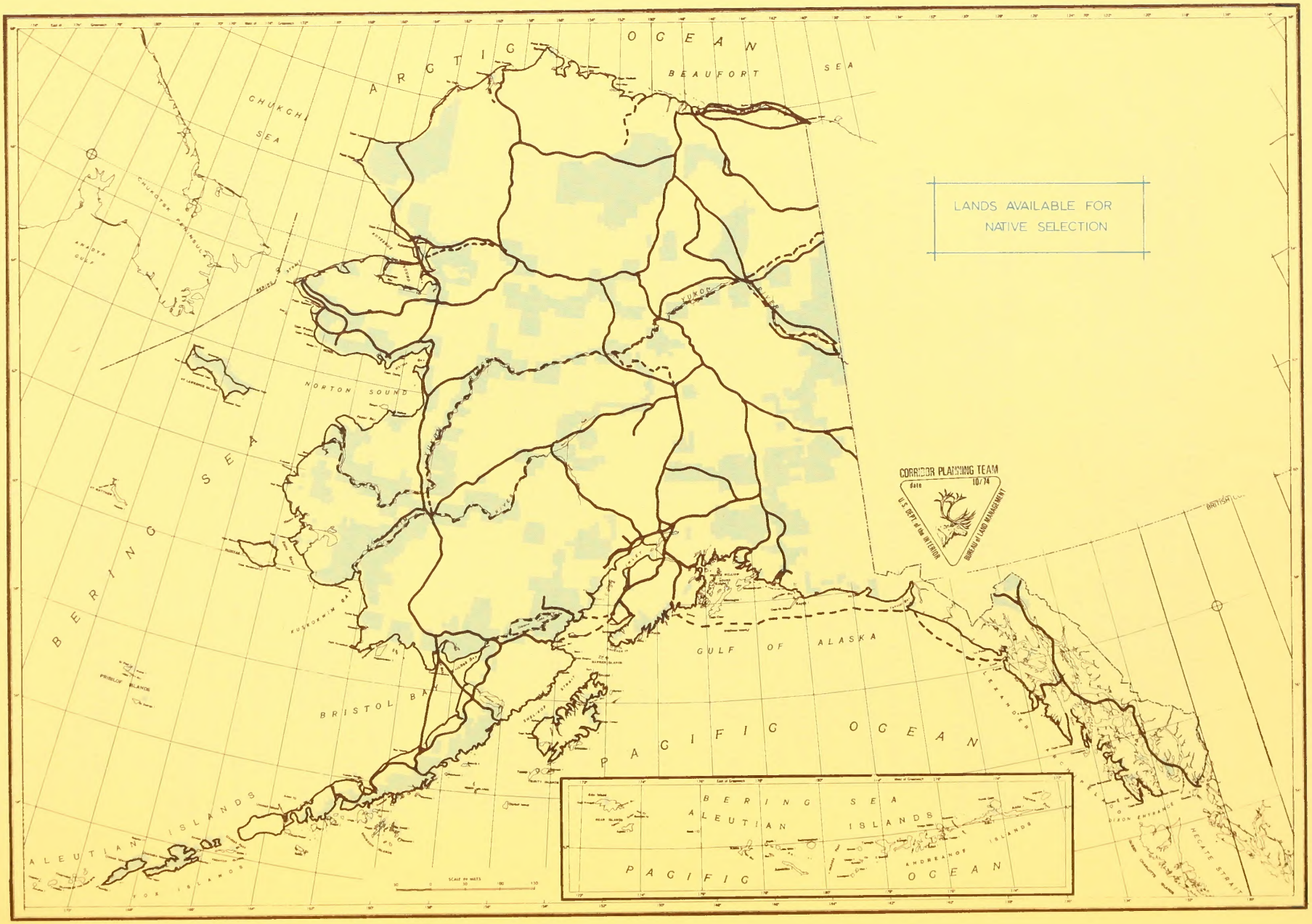
6. All corridors or transportation modes reserved for public access across lands transferred to Alaskan Native ownership be reviewed at least every five years to determine if easements:

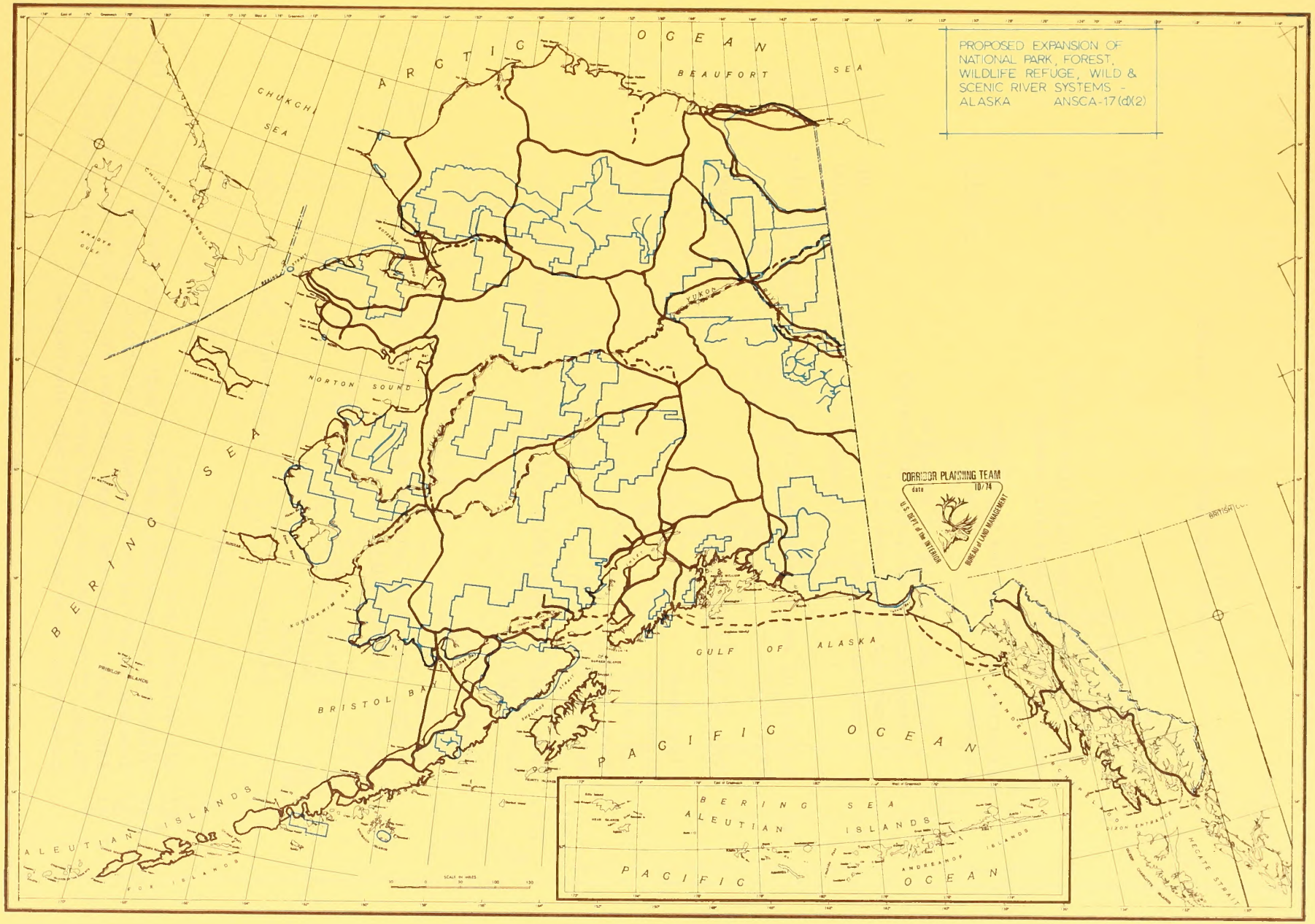
a. are still required.

b. should be modified.

c. should be relocated.

d. should be terminated.


LANDS AVAILABLE FOR
NATIVE SELECTION
CORRIDOR PLANNING TEAM
date 10/74
U.S. DEPT. of the INTERIOR
BUREAU of LAND MANAGEMENT
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
NORTON SOUND
BERING SEA
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
BERING SEA
ALEUTIAN ISLANDS
PACIFIC OCEAN


PROPOSED EXPANSION OF
NATIONAL PARK, FOREST,
WILDLIFE REFUGE, WILD &
SCENIC RIVER SYSTEMS -
ALASKA ANSCA-17(d)(2)
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
BERING SEA
NORTON SOUND
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
CORRIDOR PLANNING TEAM
date 10-74
U.S. DEPT of the INTERIOR
BUREAU of LAND MANAGEMENT
BERING SEA
ALEUTIAN ISLANDS
PACIFIC OCEAN

PRIMARY CORRIDOR SYSTEM, ALASKA

		Miles 1/
I.	Total Mileage	11,135
	Additional modes or utilities within existing Primary Corridor System	-3,379
	Existing major inland navigation routes	-2,160
	Total mileage which involves extension of existing intermodal transportation and utility corridor system	+5,596
	(rounded)	+5,600

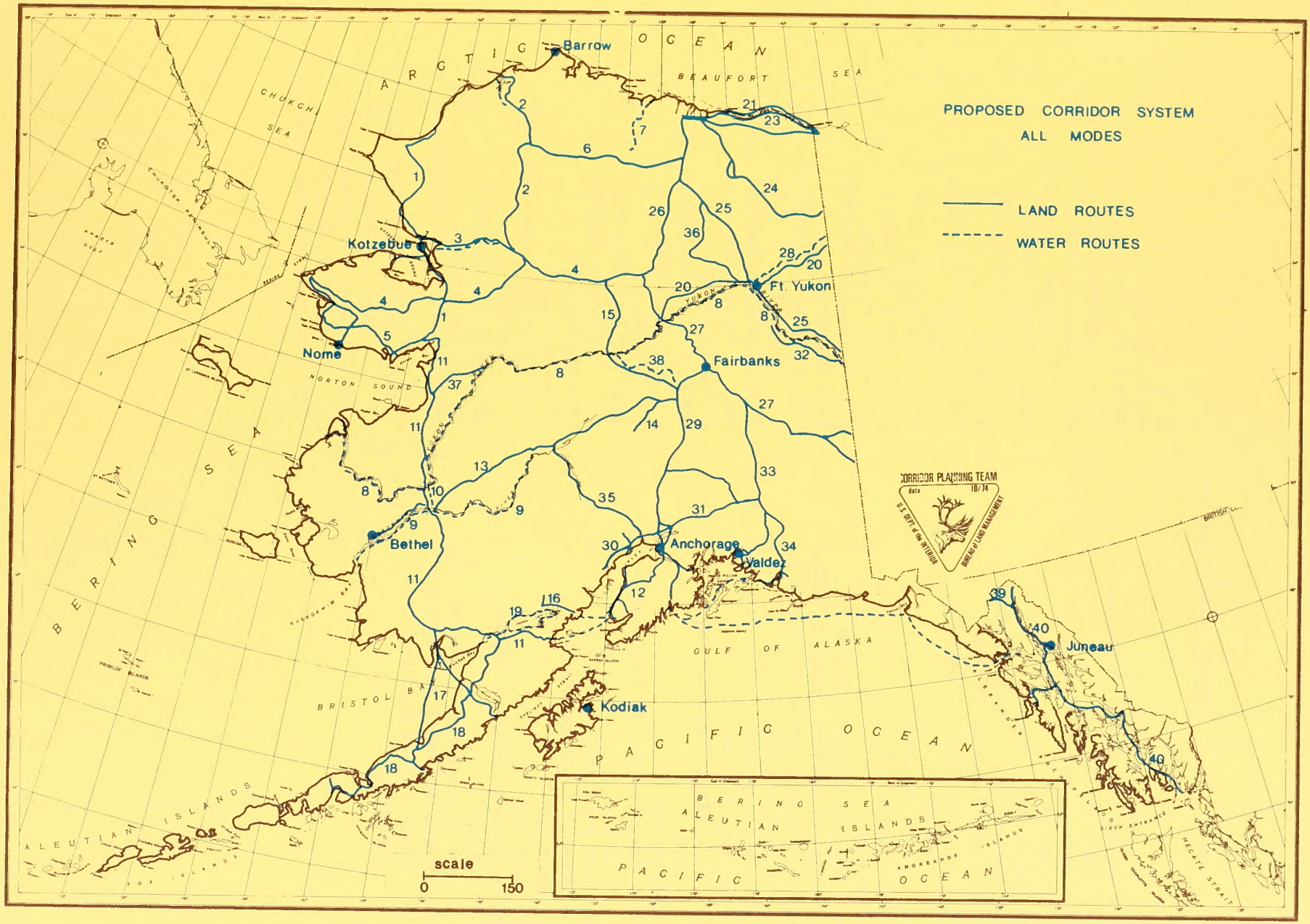
II. Mileage of new facilities within total Primary Corridor System 2/

Mode or facility	Mileage
Pipelines	+7,500
Highways	+6,000
Railroads	+2,250
Power Grids	+1,500
Navigation 3/	+ 30

III. Percentage of ownerships within total Primary Corridor System 4/

Ownership		Percentage
Federal		
(a) National Interest Lands (D-2)		12
(b) Other Federal		39
Total Federal		51
Native		27
State		22
Private	(less than 1 percent)	-0-
Total		100

1/ All mileages are approximate.
2/ Mileages are not additive since many occupy the same Primary Corridor.
3/ Assumes major inland waterways are already part of the existing system.
4/ Based upon withdrawal maps prepared by the Department of the Interior, March, 1974. Land ownership presently is in a flux as Native and park areas have not been firmly determined.


PROPOSED CORRIDOR SYSTEM
ALL MODES
LAND ROUTES
WATER ROUTES
Barrow
Kotzebue
Nome
Bethel
Kodiak
Anchorage
Valdez
Fairbanks
Ft. Yukon
Juneau
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
BERING SEA
NORTON SOUND
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
scale
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CORRIDOR PLANNING TEAM
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Symbol Identification

ACV - Air Cushion Vehicle
ADH - Alaska Department Highways
AG - Alaska Arctic Gas
ANWR - Arctic National Wildlife Refuge
AP - Agriculture Product
APA - Alaska Power Administration
APO - Alaska Pipeline Office
APSC - Alyeska Pipeline Service Company
ARR - Alaska Railroad
A - Archelogical Valves
C - Caribou
CNF - Chugach National Forest
CPT - BLM - Corridor Planning Team
CRNWR - Clarence Rhodes National Wildlife Refuge
DL - Deficiency Lands
EP - El Paso Natural Gas Co.
ETL - Electrical Transmission Line
F - Fisheries
GANP - Gates of Arctic National Park
GPL - Gas Pipeline
GT - General Transportation
H - Hydrology
HWY - Highway
INRR - Iliamna National Resource Range
INT - Secretary of the Interior
KNMR - Kenai National Moose Range
KVNM - Kobuk Valley National Monument
Min. - Mining
MMNF - Mt. McKinley National Park
MPL - Mineral Slurry Pipeline
MRWA - McNeil River Wildlife Area
N - Noise
NAR - Noatak Arctic Range
NG - Natural Gas
O & G - Oil and Gas
OPL - Oil Pipeline
OSV - Over-snow Vehicle
PF - Permafrost
PNF - Porcupine National Forest
PV - Primitive Values
Rec. - Recreation
S - Dall sheep
SOCAL - Standard Oil California
T - Timber
TNWR - Togiak National Wildlife Refuge
WC - Watercraft
WF - Waterfowl
WMNF - Wrangell Mt. National Forest
WP - Water Pollution
WQ - Water Quality
YCNR - Yukon-Charlie National River
YDNWR - Yukon Delta National Wildlife Refuge
YFNWR - Yukon Flats National Wildlife Refuge
YKNF - Yukon-Kiskokwim National Forest

No.	Name	Approx. Length	Mode	Identifying Agency	Environmental Impacts	Purposes	Native	(d)(2)*
1.	Lisburne-Koyuk	375	MPL, GPL, OPL HWY, RR	CPT, ARR, ADH	A, PF, C, H, WQ, PV, WF	O & G, Coal, Min., GT	4 Villages DL	Cape Krustenstern
2.	Pet 4, South	300	OPL, GPL RR, HWY	ADH, CPT, Navy	A, Scenic, WP, C, WF, PF, PV	GT, O&G, Min., Copper, coal	1 Village	KVNM NAR
3.	Lower Kobuk Valley	125	RR, OPL, GPL, HWY	ARR, CPT, ADH	C, PV, WF, PF, F	O & G, Coal, Min., GT	3 Villages DL	KVNM NAR
4.	Prospect-Lost River	550	RR, GPL, HWY, MPL, OPL, ETL	ADH	C, WF, PV, H, WP, PF	O & G, Min., GT	9 Villages DL	CNR SNWR CANP
5.	Seward Peninsula, South coast	275	RR, GPL, OPL MPL	ARR, ADH	WF, PV, scenery, PF	Minerals, O & G, GT	DL 6 Villages Elim Reservation	
6.	Pet 4, East	250	HWY, GPL, OPL	ADH, Navy	C, PV, WF, PF Scenic	O & G, Coal, GT	DL	
7.	Colville River	100	WC, ACV, OSV	CPT	WF	O & G	DL	
8.	Yukon River	1,200	Boats, WC, barges, ACV	BLM-CPT	Docks, dredging (man-made facilities), WF, WP, WQ, F, Peregrine falcon	GT	24 Villages	YKNF YFNWR YDNWR CRNWR YCNR
9.	Kuskokwim River	300	Boats, WC, Barges, ACV, OSV	BLM-CPT	Docks, dredging (man-made facilities), WF, F, WP, WQ	GT	17 Villages DL	YKNF
10.	Yukon-Kuskokwim Canal	30	Boats, WC, Barges, ACV, OSV	COE	WQ, Water inter-change, H, WF, PF, F, docks, N	GT	3 Villages DL	YDNWR
11.	Koyuk-Kamishak Bay	650	OPL, GPL, HWY	ADH, CPT	WQ, WF, PF, H, F, PV, N	O & G, Min. GT	13 Villages DL	INRR TNWR YDNWR MRWA

No.	Name	Approx. Length	Mode	Identifying Agency	Environmental Impacts	Purposes	Native	(d)(2)*
12.	Anchorage-Homer Power grid	180	ETL, under-water cable	APA	Scenic, WF, WQ, F, H	Hydropower	3 Villages	KNMR
13.	Bethel-Rex	500	HWY, GPL, OPL	ADH, BLM	WQ, H, PF, WF, F	Minerals, O & G, GT	DL 7 Villages	YKNF MMNP add.
14.	Kantishna Spur	25	HWY	F-SLUPC	WQ, H, PF, PV	Minerals, GT, Rec.	1 Village DL	MMNF
15.	Allakaket-Nenana Rail	250	RR	ARR, ADH	WQ, H, PF, F, WF, PV	Minerals, Coal, O & G, GT	5 Villages DL	
16.	Port Alsworth-Copper	80	MPL, HWY	ADH, CPT	WQ, H, PF, F, WP, WF	Minerals, GT, Rec.	4 Villages DL	
17.	Bristol Bay Pipeline	A (150) B (200)	OPL, GPL	CPT, BLM	WQ, F, WF	O & G	6 Villages	
18.	Alaska Peninsula	500	OPL, GPL, HWY, ETL	ADH, CPT, BLM	C, WQ, H, PF, F, WF, PV, Scenic, C, bear denning, off-shore marine, earthquake	O & G, GT	10 Villages	NWLR INRR
19.	Iliamna Lake	150	WC	CPT	F, Scenic, WF	GT, F	5 Villages	
20.	Porcupine-Flats	160	OPL, GPL, H	CPT-BLM	WP, WF, F, N, Scenic, PF, Peregrine falcon	GPL, OPL, T, AP, GT	4 Villages 1 NRD	PNF, YFNWR Yukon Flats
21.	Beaufort Sea Offshore	200	GPL, OPL, HWY	AG	WF, WP, N, PF	NG		
22.	Arctic Game Range, Foothills	200	GPL, OPL	AG, CPT	WF, C, PF, N, Polar bear	O & G	1 Village	ANWR
23.	Arctic Game Range, Shoreland	200	GPL, OPL, HWY	APO	WF, PF, N, Scenic, F, Polar bear	O & G, GT	1 Village	ANWR

No.	Name	Approx. Length	Mode	Identifying Agency	Environmental Impacts	Purposes	Native	(d)(2)*
24.	Arctic Game Range, Boundary	300	GPL, HWY, OPL	AG, INT	WF, C, S, PF, WP, N, Scenic, PV	O & G		Corridor
25.	Prudhoe-Fort Yukon	400	OPL, HWY, GPL	AG	C, WP, PF, N, WF	O & G	2 Regions 3 Villages	ANWR, PNF YCNR
26.	Prudhoe to Yukon River	320	OPL, HW, GPL	INT	C, WP, PF, N, WF,H, F	O & G		Corridor
27.	Rampart-Canada	375	OPL, GPL, HWY, ETL	AG, EP, CPT, ADH, APA	WP, C, WF, Possible peregrine falcon	O & G	4 Villages	
28.	Porcupine River	210	ACV, WC, OSV	BLM, CPT, Int'l Treaty	WF, WP, PF, F, WQ, Scenic, Peregrine falcon	GT	2 Villages DL	PNF
29.	Railbelt and Power Grid	600	OPL, GPL, ETL	EP, APA, CPT	WP, Scenic, PF, H, WF, F	O & G, ETL	4 Villages	MMNP
30.	Upper Cook Inlet	175	OPL, GPL, HWY, ETL	CPT, ADH, EP	WF, WQ, F	O & G, Coal	6 Villages	
31.	Glenn Highway	140	OPL, GPL, ETL	CPT, APA	Scenic, WF, F, PF	O & G, ETL	2 Villages 1 NRD	
32.	Circle-Eagle	130	OPL, GPL, HWY	AG, ADH	Scenic, WP, PF, Peregrine Falcon, WF, S, C, PV	T, Min., Rec., O & G	1 NRD 2 Villages	YCNR PNF
33.	Big Delta-Valdez	290	OPL, GPL, ETL	EP, APSC	WP, Scenic, C, F, PF	O & G	5 Villages	Corridor
34.	Copper Valley	90	GPL, OPL, HWY, MPL	ADH, EP	Scenic, WF, F, S, Goat, Brown bear, Black bear	People - Min., O & G	1 Village 2 NRD	WM, NF, CNF

No.	Name	Approx. Length	Mode	Identifying Agency	Environmental Impacts	Purposes	Native	(d)(2)*
35.	Rainy Pass	225	HWY	ADH, F-SLUPC-RPT	Scenic, WQ, PF, F, Black bear, Moose	Minerals, GT, AP, T	1 Village	State lands
36.	Chandalar	200	GPL, OPL, HWY	CPT	C, WP, PF, N, WF, F	O & G	1 Village 1 NRD	AGR, Ext. Yukon Flats
37.	Unalakleet	80	OPL, GPL	CPT	WQ, H, PF, F	O & G	7 Villages 4 NRD	
38.	Tanana River	200	WC, ACV, OSV	BLM	WP, WQ, F, WF	GT	2 Villages 1 NRD	YKNF
39.	Haines	50	HWY, OPL, GPL	EP, CPT	Scenic, WQ	GT, O & G	1 Village	
40.	SE Power grid	550	ETL	APA	WQ, H, Soils, Brown bear, Goat, Deer, Bald eagles, Peregrine falcons, WF, F, Scenic	ETL		

NOTES:

Water Quality - Affected by oil leakage, construction work would cause additional sediment and erosion problems.
Waterfowl - General disturbance, drainage.
Permafrost - Effect change and degradation.
Hydrology - Generalizing effect of change of flow of water.
Fisheries - Sport and anadromous.

TOTAL LENGTH: 11,135

(Scenic
(Natural - Differentiate between Scenic, Natural, and Primitive Values.
(Primitive

*Proposed additions to the National Park, Forest, Wildlife Refuges and Wild and Scenic Rivers Systems in Alaska.

PLANNING METHODOLOGY

Resource data, including areas used for subsistence purposes, compiled by the Resource Planning Team of the Joint Federal-State Land Use Planning Commission 1/, together with some 800 transparent overlays keyed to the U.S. Geological Survey topographic map series (scale 1:250,000), and other transportation plans have been carefully reviewed. This review consisted of examining some 15 basic data overlays on a wide range of conditions including mineral and energy resources, soils, wildlife habitats, agricultural and forestry potential, scenic, primitive and natural features, key fisheries areas and proposals for transportation and utility corridors needed to meet Alaska's future requirements.

Review resulted in an initial system, a set of planning assumptions and corridor location guidelines. Each assumption and guideline was tested against the initial system which in turn resulted in the proposed Primary Corridor System. It was found that in some cases it was not possible to avoid certain areas; likewise it was not possible to serve all areas of the State. Preliminary selection of each Primary Corridor sought to obtain the best physical route, avoid known critical or superlative areas (wildlife or scenic), yet provide access to other areas where more intensive land use was indicated, such as mineral and energy provinces.

The fundamental concept used to determine whether a Primary Corridor was needed is directly related to the development and movement of energy resources in Alaska. Once high-value energy resource areas were identified, the routing selection involved the basic question:

IF THERE IS A SIGNIFICANT ENERGY RESOURCE, HOW CAN IT BE BEST BROUGHT TO MARKET?

1/ Resources of Alaska -- A Regional Summary, July 1974

ASSUMPTIONS

The following assumptions were used in the preliminary identification of the Primary Corridor System, Alaska:

1. Selection of lands by Alaskan Native village corporations under ANCSA by December 18, 1974, and the requirement for the Secretary to consider and reserve identified public easements across Native-selected lands compels immediate identification of a state-wide Primary Corridor System if lands are to be transferred to Native ownership without undue delay.

2. Priority Alaskan energy resources will be developed by the year 2001.

3. Transportation and development of energy and mineral resources will require surface routings within Alaska.

4. It is desirable to consolidate separate transportation and utility facilities into common corridors wherever possible to minimize adverse environmental impacts and prevent proliferation of separate rights-of-way throughout Alaska.

5. In some areas there are several corridor routings which could serve the same energy and mineral resources. Such multiple routings are alternatives which will be terminated or modified when one of the identified corridors is selected for construction of transportation and utility facilities.

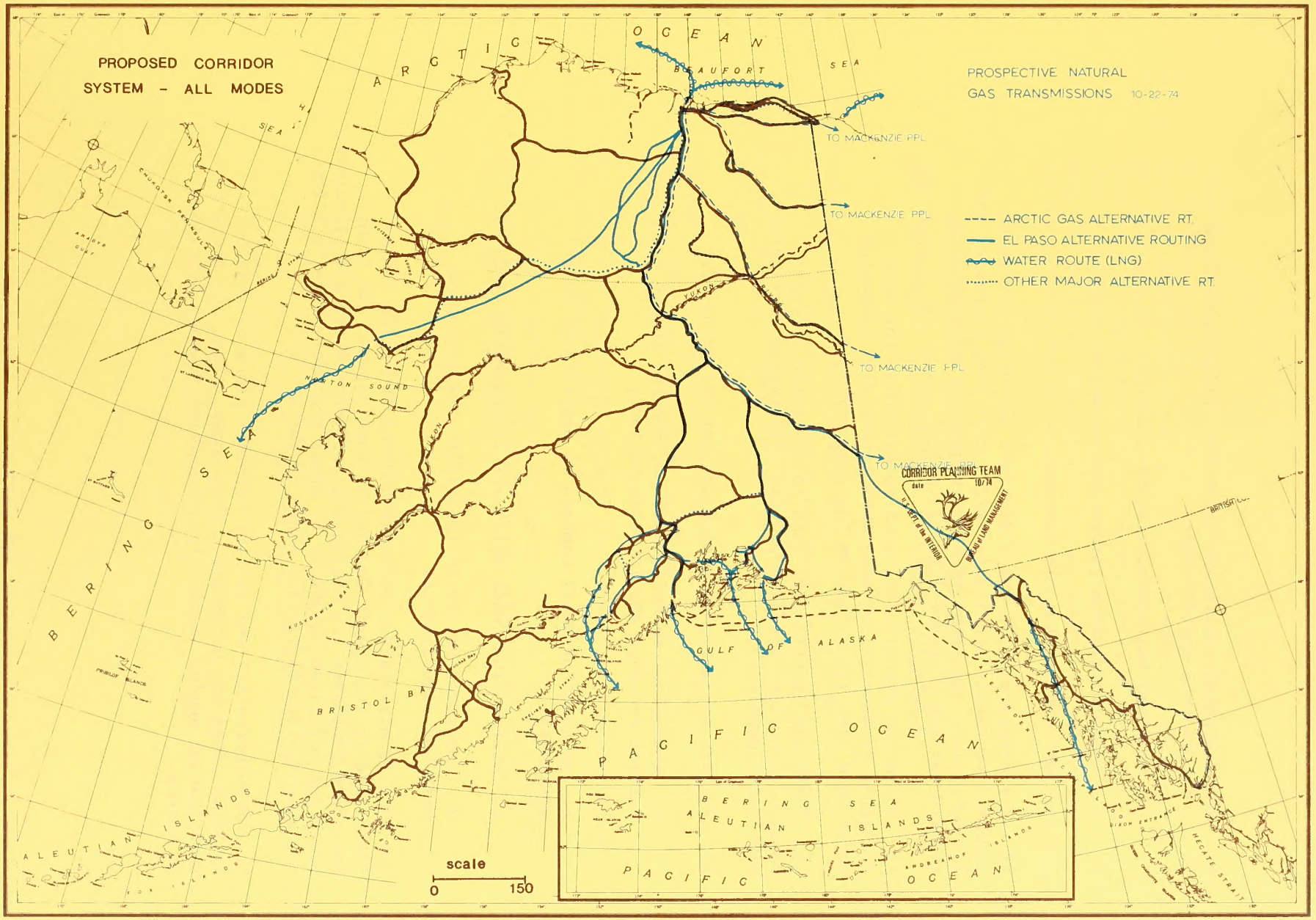
6. Corridors involving pipelines should also reserve the option to include identified highway or rail transportation.

7. Surface transportation from off-shore oil and gas fields will tie to the closest identified Primary Corridor.

8. A viable economy for Alaska cannot be maintained on a program emphasizing only exportation of energy and non-energy resources.

9. Rail and waterborne transportation are and will continue to be economical modes for significant sustained and regular movement of heavy and bulky commodities over long distances.

10. Transportation by sea is not practical year-round above 65^{o} North Latitude without effective ice-breaking capabilities.


PROPOSED CORRIDOR
SYSTEM - ALL MODES
PROSPECTIVE NATURAL
GAS TRANSMISSIONS 10-22-74
ARCTIC GAS ALTERNATIVE RT.
EL PASO ALTERNATIVE ROUTING
WATER ROUTE (LNG)
OTHER MAJOR ALTERNATIVE RT.
TO MACKENZIE PPL
TO MACKENZIE PPL
TO MACKENZIE PPL
TO MACKENZIE PPL
CORRIDOR PLANNING TEAM
date 10/74
ARCTIC OCEAN
BEAUFORT SEA
BERING SEA
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
NORTON SOUND
YUKON
scale
0
150

11. Major Alaskan rivers are natural corridors which now or in the future will provide for:

a. seasonal waterborne transportation;

b. seasonal transportation over snow/ice, and;

c. air cushion vehicle movement.

12. Air transportation has a distinct advantage for rapid movement of people and light freight over long distances and for infrequent movement of heavy equipment and does not require surface corridor identification.

13. There are insufficient data to determine the most desirable transportation mode when potentially competing modes have been identified in the same corridor.

14. There are insufficient data to determine the most desirable corridor when two or more alternative corridors have been identified.

15. Primary corridors in Alaska are not warranted for:

a. communication systems do not require linear surface routings and interconnections;

b. movement of small numbers of people over long distances;

c. winter haul roads which are infrequently used, or;

d. resources having no identified state-wide or national significance.

16. The 12 alternative routings and the two prime routes identified in the Arctic Gas and El Paso natural gas transportation proposals are considered corridors where oil pipelines, other gas pipelines, highways or other transportation, utility or communication facilities could be added.

17. Transportation and utility corridor plans in adjacent Canadian areas are uncertain. When known, these may require modification and/or termination of several Primary Corridors in Alaska.

18. Identification of any specific mode of transportation or utility facility within a corridor is not made on the basis of a detailed evaluation that the specific mode should be constructed! Identification indicates an expectation that it might be a reasonable choice. It is further assumed that a detailed environmental impact statement would be prepared prior to construction of any mode and that alternative routings would also be considered prior to construction.

PLANNING GUIDES FOR LOCATION OF PRIMARY CORRIDOR SYSTEM, ALASKA

The following planning guides were used in the preliminary identification of corridors, which has been done without regard to existing or prospective land ownerships; in identification of Primary Corridors the importance of land use far exceeds that of land ownership.

1. Apply information on file with the Joint Federal-State Land Use Planning Commission and from other readily available sources.

2. Maintain reasonable options for identified transportation and utility facilities.

3. Corridors will be specific as to the time frames, number, and type of transportation and utility facilities to be identified in an easement.

4. Corridors should:

   a. minimize impact on Alaskan life styles;

   b. provide access to secondary resources having an identified high potential for development, while still maintaining the shortest practicable distance between the primary resource area and the use of transshipment location.

   c. consider existing and prospective land use capability including topography, soil, permafrost, and earthquake prone zones, and;

   d. consider the availability of gravel.

5. Wherever possible, corridor location should avoid:

a. village business, residential, and projected expansion areas;

b. high density fish and wildlife rearing areas;

c. key habitat for fish and wildlife species, especially areas used by endangered species;

d. areas of high scenic, geologic, botanic and zoologic, historic or archeological values where there is also high primitive value, and;

e. areas where a significant portion of the residents maintain a subsistence life style.

6. Corridor width is a function of:

a. Number and type of identified facilities within the corridor;

b. physical environment;

c. availability of detailed engineering data for one or more modes within the corridor;

d. safe location between different facilities within the corridor; and

e. esthetics.

7. Corridor location should be made on the basis of the most restrictive mode or facility expected to be considered in that area. In order of decreasing sensitivity are:

a. mineral slurry pipeline;

b. railroad;

c. highway;

d. oil or natural gas pipeline;

e. power transmission line.

PURPOSE

Preliminary identification of the Primary Corridor System, Alaska has been made by an interdisciplinary team to assist the Secretary of the Interior in meeting five legislative mandates:

1. Alaska Native Claims Settlement Act (ANCSA), P.L. 92-203, provides that the Secretary shall, in consultation with the State and the Joint Federal-State Land Use Planning Commission, reserve public easements he determines necessary across land selected by village and regional corporations. Easement identification is to include foreseeable public needs through the year 2001. Public lands are daily being transferred to Alaskan Natives with public easements being reserved on a piece-meal basis for both local and state-wide needs. Some 44 million acres are involved.

2. Mineral Leasing Act of 1920, Amendments, and Trans-Alaska Oil Pipeline Authorization, P.L. 93-153, provides in Title I that the Secretary shall, in consultation with Federal and State agencies, review needs for a national system of transportation and utility corridors across Federal lands and report his findings and recommendations to Congress and the President by July 1, 1975.

3. Mineral Leasing Act of 1920, Amendments, and Trans-Alaska Oil Pipeline Authorization, P.L. 93-153, in Title III authorizes and directs the Secretary to investigate feasibility of one or more oil or gas pipelines from Alaska via Canada. The Secretary's report must be submitted to the House and Senate Committees on Interior and Insular Affairs by November 16, 1975.

4. National Environmental Policy Act of 1969 (NEPA), P.L. 90-190, requires all reasonable alternatives of projects be evaluated and described in an Environmental Impact Statement (EIS). Applications to approve transmission of natural gas from Alaska's North Slope to markets in the conterminous United States have been received. EIS preparation on these applications will require evaluation of at least 14 alternative route locations within Alaska and the relation of each to the potential state-wide Primary Corridor System.

5. Alaska Native Claims Settlement Act (ANCSA), P.L. 92-203, required under the provisions of Section 17(d)(2) that the Secretary identify additions in Alaska to the national park, forest, wildlife refuge, and wild and scenic rivers systems. Some 83 million acres of land are involved. These proposals, submitted to the President and Congress in December, 1973, noted:

> We recognize in submitting these proposals to the Congress that further information is needed before decisions can be reached on some issues. As Alaska continues to develop, there will be need for rights-of-way and corridors to adequately accommodate transportation and utility requirements. However, the information on these needs is not fully developed at this time and therefore decisions cannot be made before the December 18, 1973 deadline.... We plan to keep our proposals and their resources under continuing study to determine what these needs are and how they can be met.... If changes are determined necessary, they will be referred to the Congress for appropriate action.... 1/

Appendix I provides a summary of Federal laws and regulations, State of Alaska Constitution, and State laws which are important in the development of a State-wide multimodal transportation system in Alaska.

1/ Secretary of the Interior Rogers C. B. Morton, December 17, 1973. Letters of Transmittal to the Congress for proposed addition of public lands in Alaska to the national park, forest, wildlife refuge and wild and scenic rivers systems.

History of Transportation In Alaska

TRANSPORTATION AND UTILITIES IN ALASKA

Alaska's economy, excluding governmental expenditures, is largely based on the development, harvest and export of its natural resources (oil, natural gas, fish, timber), and on tourism (cultural, scenic, wildlife, fishery and wilderness resources). The transportation system within the State has developed to serve these values.

Due to Alaska's strategic location on great circle or shortest distance routes between Western Europe, the Orient and North America's West Coast, Alaska has also become a crossroads for long-range jet aircraft. The shortest marine route for shipping between the Western United States and Japan skirts the southern coastal areas of Alaska.

Early travel in Alaska centered along the coastal areas and inland waterways. Boats were the principal mode for movement of people and goods. For practical purposes, muskeg and swift, cold rivers precluded major cross-country travel during the summer. Until the great Klondike, Nome and Fairbanks gold strikes in the late 1890's-early 1900's, movement of people within Alaska involved only small numbers. However, with the rapid influx of people who in time spread through much of the State, a more orderly and regular means for moving people, supplies and the mail received attention.

In 1923, the Alaska Road Commission reported a state-wide network of 9,301.25 miles of road and trail as follows:

Wagon road	1,323.75
Sled road	1,115.00
Permanent trail	6,150.50
Temporary flagged trail	712.00
	9,301.25

The majority of the miles of wagon road in 1923 comprised the network between Valdez and Fairbanks. Most of the permanent and temporary flagged trail involved dog sled mail routes through Interior Alaska. These tended to follow river valleys from settlement to settlement. The number of miles of trail maintained by the Federal Government began to decline in the late 1920's when the air mode began to replace dog sled or steamship modes.

A specialized travel mode in Alaska, winter haul roads, developed as heavy loads were moved by sled trains pulled across frozen tundra and rivers by tracked vehicles. These tended to be

specialized, temporary trails used to transport military construction supplies to DEW line sites and move heavy drilling equipment for oil and gas exploration. Today, large fixed-wing aircraft and helicopters provide more rapid, regular movement of bulky construction supplies and heavy exploration equipment in a fraction of the time required for surface movement during harsh arctic winter months. Still, in 1973-74 a major component of the housing requirements for construction of the trans-Alaska oil pipeline was moved northward over a winter haul road.

A. Social Impacts

Basic decisions on the short- and long-range social, economic and environmental land uses are being made daily as lands are transferred to Native ownership, the State completes its selection of lands and as Congress starts its consideration of addition of public lands in Alaska to the national park, forest, wildlife refuge and wild and scenic rivers systems.

These and the fundamental questions noted previously will be the subject of intensive, detailed study at such time as specific transportation or utilities are proposed for construction.

This study, however, concludes that now is the time to provide initial corridor shape and scope as a basis for public discussion so that alternatives can be considered as land uses are being decided. The location of the Primary Corridor System attempts to avoid village population centers and areas where there are a significant number of residents maintaining a subsistence life style.

There are serious concerns that any major expansion of the existing multimodal transportation system (including air) will "open up" areas to development and land uses not now possible. There are fundamental unanswered questions such as:

1. WHAT ARE IMPACTS ON LIFE STYLES OF LOCAL RESIDENTS?

2. HOW WILL EXISTING SOCIAL SERVICES BE IMPACTED?

3. WILL OTHER PROGRAMS BE FOREGONE OR DELAYED?

4. WHAT IS THE ACTUAL POTENTIAL OF IDENTIFIED RENEWABLE AND NONRENEWABLE RESOURCES?

5. WHAT ARE ALASKA'S SHORT- AND LONG-RANGE MULTIMODAL REQUIREMENTS?

6. WHO PAYS THE COSTS OF DEVELOPMENT AND MAINTENANCE?

7. IS THERE A REASONABLE ALTERNATIVE ROUTE?

8. IS THERE AN ALTERNATIVE MODE WHICH CAN DO THE SAME JOB WITH LESS IMPACT?

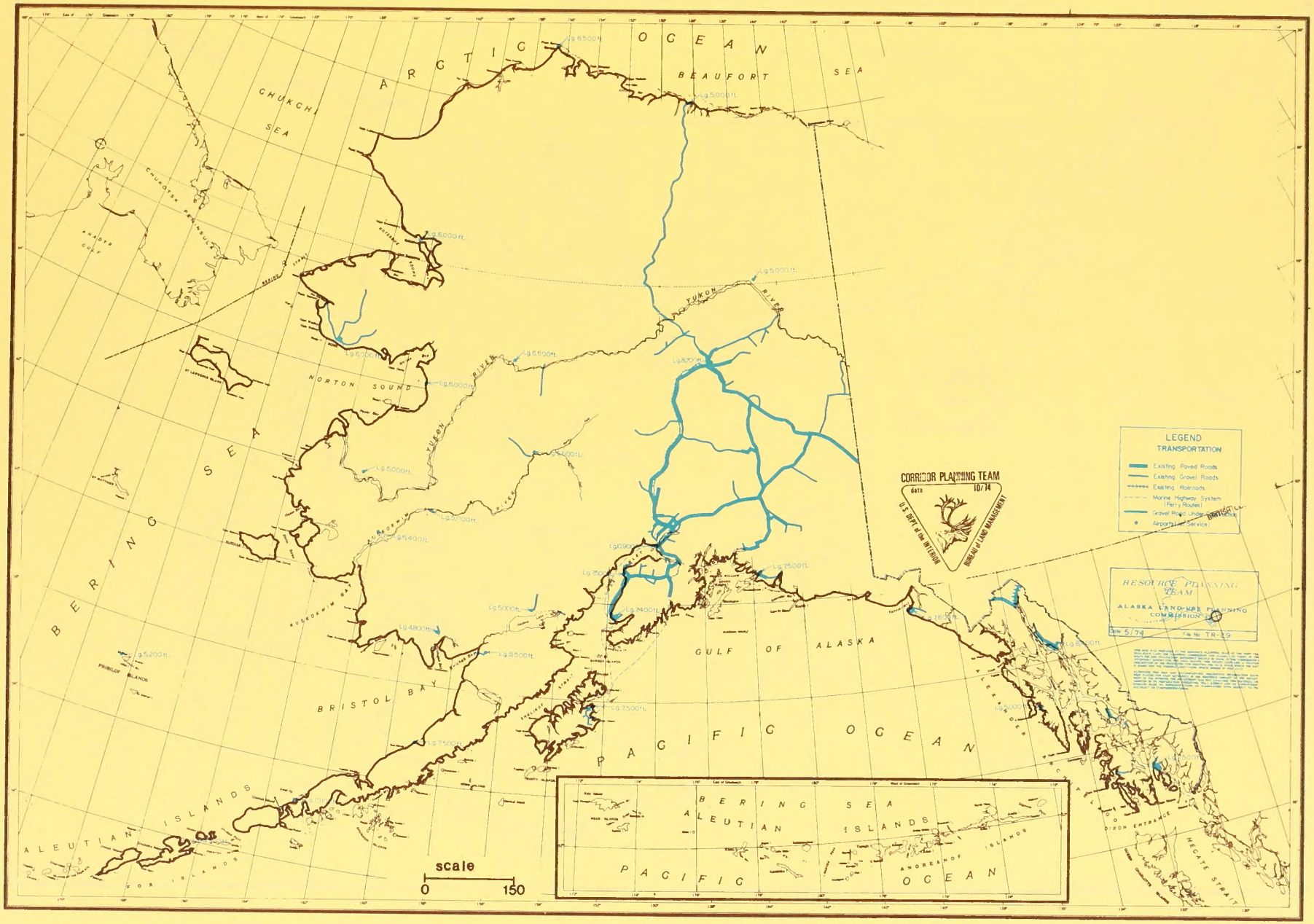
Most impacts arising from the construction of a state-wide, multimodal transportation and utility system are cumulative. Although there are no immediate, direct on-the-ground effects from identification of corridors, modes of transportation or types of utilities, designation can have impacts on Alaskans. Designation will result in pressure to develop "now" because opportunity will be lost after the year 2001. Designation will concentrate, rather than disperse, intensive land uses along the Primary Corridors, while other areas are identified as places where surface transportation should be restricted. Until the final mix and type of facilities are more certain, it is extremely difficult to evaluate intensive impacts. For example, a natural gas pipeline without a highway has different impacts than one with a highway. Similarly, a highway has different advantages and disadvantages than a railroad; a small diameter (9-inch) pipeline vs. a large diameter (48-inch) hot oil line has different results when buried or on the surface.

B. Transportation Modes

1. Highways.

Excluding city streets and local borough roads, there are 3,379 miles of paved and gravel highways in Alaska. This includes the 345-mile long gravel road extending northward from the Yukon River along the Trans-Alaska Pipeline route to Prudhoe Bay. Other than population centers of Anchorage and Fairbanks, the State as a whole is not accessible by connecting highways. The 1,519-mile long Alaska Highway from Dawson Creek, B.C., Canada, to Fairbanks, Alaska, provides the only continuous highway link with the conterminous United States. Even so, Fairbanks is more than 2,300 miles by road from Seattle, Washington. Juneau, the present State Capital, is accessible only by ferry or by air.

In addition to the 1,519-mile long Alaska Highway connection with the conterminous United States, a marine ferry system provides for movement of autos and passengers between Seattle,


ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
BERING SEA
NORTON SOUND
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
YUKON RIVER
KUSKOKWIM R.
CHUKOTSK PENINSULA
ANADYR GULF
PRIBILOF ISLANDS
KODIAK
DIXON ENTRANCE
HECATE STRAIT
CORRIDOR PLANNING TEAM
date 10/74
U.S. DEPT of the INTERIOR
BUREAU of LAND MANAGEMENT
LEGEND
TRANSPORTATION
Existing Paved Roads
Existing Gravel Roads
Existing Railroads
Marine Highway System (Ferry Routes)
Gravel Road Under Construction
Airports (Jet Service)
RESOURCE PLANNING TEAM
ALASKA LAND USE PLANNING COMMISSION
date 5/74
File No. TR-29
scale
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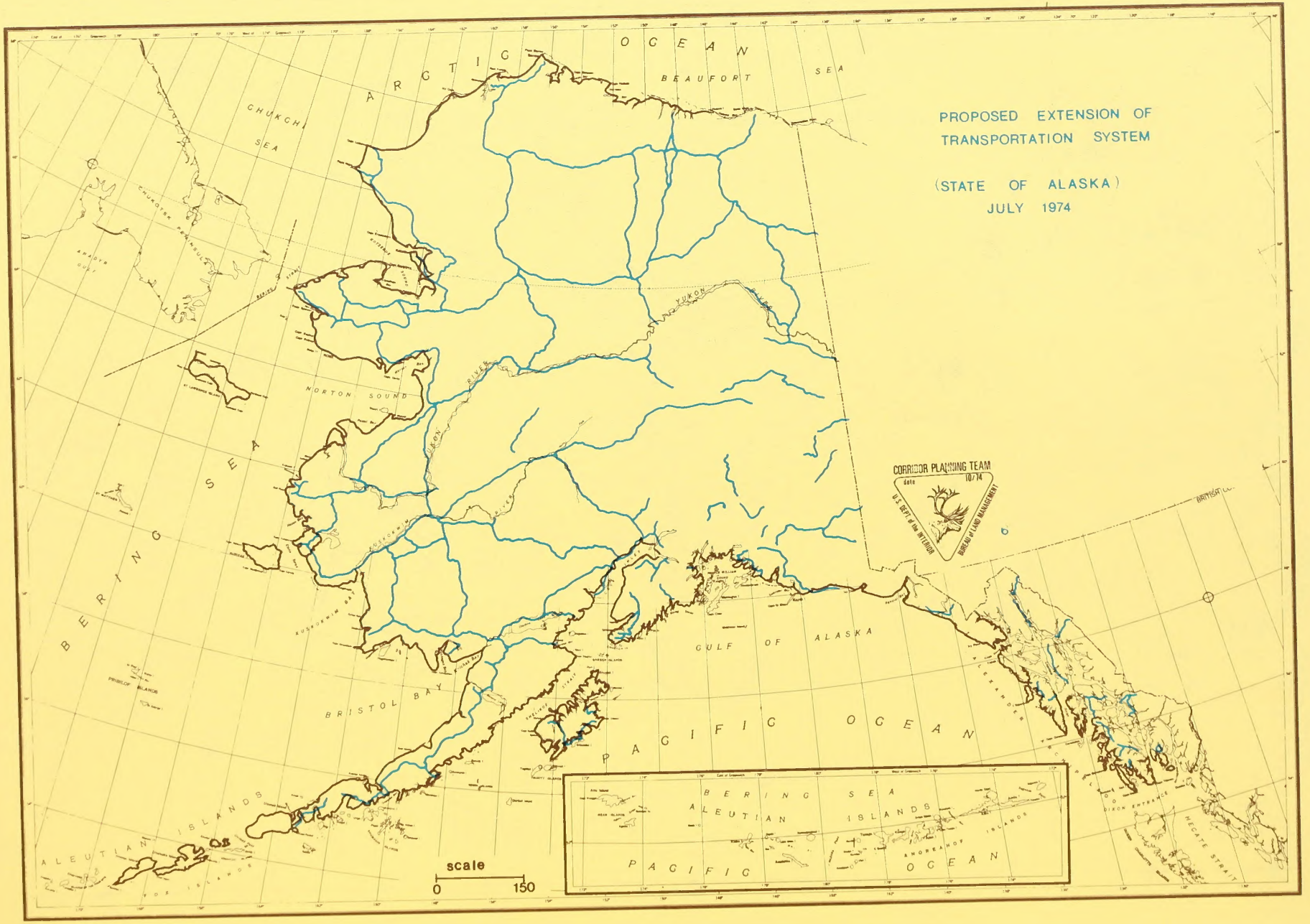

PROPOSED EXTENSION OF
TRANSPORTATION SYSTEM
(STATE OF ALASKA)
JULY 1974
CORRIDOR PLANNING TEAM
10/74
date
U.S. DEPT of the INTERIOR
BUREAU of LAND MANAGEMENT
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
CHUKOTSK PENINSULA
ANADYR GULF
NORTON SOUND
YUKON RIVER
KUSKOKWIM BAY
BERING SEA
PRIBILOF ISLANDS
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
FOX ISLANDS
BRITISH
scale
0
150
BERING SEA
ALEUTIAN ISLANDS
PACIFIC OCEAN
ANDREANOF ISLANDS
DIXON ENTRANCE
HECATE STRAIT

Washington, and Haines, Alaska. At Haines, the 159-mile long Haines Cutoff provides direct highway access to the Alaska Highway via western Canada.

Plans submitted to the Joint Federal-State Land Use Planning Commission in July, 1973, by the Alaska Department of Highways proposed an approximately 11,700-mile expansion of the existing highway and rail network. 1/ These proposals have been considered in the Primary Corridor System.

2. Ferry.

Since 1963, the State-owned and -operated Alaska Marine Highway System has provided a water linkage for passengers and vehicles between Prince Rupert, B.C., Canada, and Southeastern Alaska. In 1967, service between Seattle, Washington, and Skagway, Alaska, began. A major purpose of the marine highway system is to provide regular service at reasonable cost to population centers not connected to the land highway network. Ferry service is provided throughout Southeastern Alaska; Cordova-Valdez-Whittier, and; Seward-Homer-Seldovia-Kodiak. Expansion of the Marine Highway System to Bristol Bay may take place in the future.

Re-establishment of an inland ferry system on the upper Yukon River between Circle and Eagle, Alaska, and Dawson, Y.T., Canada, is being given active consideration. Navigation on the Yukon, Porcupine and Stikine Rivers is of international importance, and is guaranteed under Article XXVI of the May 8, 1871 Treaty of Washington between the United States and Great Britain. Importance of movement of people and goods by boat and over-snow vehicles on these waterways and the Koyukuk and Kuskokwim Rivers has been considered in development of the Primary Corridor System.

3. Rail.

The 520-mile long Alaska Railroad was principally constructed during the period 1914-1923. Authorized for Federal operation by the Congress in 1915, the railroad remains under Federal control, connecting seaports at Seward and Whittier with Anchorage and Fairbanks and the riverport of Nenana on the Tanana River. All railcar movement from the conterminous United States reaches Alaska via marine barge.

1/ State of Alaska Department of Highways, Planning and Research Division, July, 1973.

In addition to movement of supplies, the Alaska Railroad provides for significant transportation of people for recreational purposes as a major access mode to Mount McKinley National Park and on a more limited basis for hikers, cross-country skiers, fishermen and hunters.

The White Pass and Yukon Route, a narrow-gauge railroad owned by a Canadian corporation, links Whitehorse, Y.T., Canada, and Skagway, Alaska. As well as moving supplies for mining operations, it provides for significant tourism-related travel for people interested in the Klondike Gold Rush Era.

There are no firm plans for a link between the Alaska Railroad and Canadian railroads. There is much interest in such a connection via the continuing expansion of the rail system into the Yukon and Northwest Territories.

The Primary Corridor System proposes linkages with Canada from Fairbanks along the existing highway net and to northwest Alaska.

4. Freighter.

A major portion of food and other goods used in Alaska are transported by ship or barge for some part of the movement from the conterminous United States. Waterborne transport has shown marked increase in tonnage over the past several years (1959 - 4.7 million short tons; 1971 - 23.8 million short tons). Much of this increase is attributed to the expansion of activity by oil companies in the State. It wasn't until the early 1960's that year-around scheduled freight service came into the Port of Anchorage. This followed introduction of containerization of cargo and seatrains with increased dependability and reduced costs.

Winter sea ice in the Bering Sea and Arctic Ocean limits the shipping season to Arctic coastal areas to between two and four months each year. Earthquakes pose special hazards from the Aleutian Chain through Southeast Alaska by raising or lowering land masses or seismic waves. Strong winds, icing, and high tidal action also pose special problems.

There are several potential deep-water port areas which, if developed, would greatly expand shipping capabilities. These have also been considered in the Primary Corridor System.

5. Air.

The vast distances and existing limited capabilities of water and land transport make air transport important. The State of Alaska owns and operates most of the public airports in the State. Movement of people in Alaska is largely by air. In fiscal year 1971, a total of 1,983,400 persons moved through the State's two major international airports at Anchorage and Fairbanks. The Cold Bay Airport in the Aleutian Chain is also growing in importance as an international air link. Air taxi and charter service is routinely available throughout Alaska.

Surface reservation of corridors for air traffic is not warranted. Reservation of air space is beyond the scope of this study.

6. Foot.

Foot travel, though minimized by the use of aircraft, boat, all-terrain vehicles, dog sleds, and snowmobiles , still remains an important means of local transportation. Miners, recreationists of all kinds, subsistence hunters, surveyors, etc., often travel directly on foot or on snowshoes or skis via trail or cross-country to perform a job or reach a destination. According to the Alaska Statewide Comprehensive Outdoor Recreation Plan, constructed and maintained trail mileage totals approximately 2,400 miles. Most of this is intended to serve recreational purposes. Portions of many old trails resulting from the Gold Rush Era or more recent mining efforts still remain.

Reservation of foot, snowmachine, dog sled, ski, or related trail uses is not considered to be part of the Primary Corridor System.

7. Communications.

Presently radio, microwave, satellite, atmospheric troposcatter facilities, underwater cable and some open wire are in use. The Department of Defense, RCA Alascom, and State, Federal, and private agencies operate their own communications systems. Local communications systems are provided by both public and private agencies.

The need for on-the-ground linear corridors for long-line communications in Alaska passed after introduction of radio to Alaska in the early 1900's. Existing and anticipated future communications requirements do not appear to warrant reservation of linear corridors within the proposed Primary Corridor System.

8. Pipelines.

Alaska has several small-diameter existing pipelines used for transporting petroleum products. These include Haines to Fairbanks, Whittier to Anchorage, Granite Point to Drift River, and the Kenai Peninsula to Anchorage lines.

A Federal permit has been issued for construction of a 48-inch, 800-mile long hot oil pipeline from Prudhoe Bay to the ice-free port of Valdez. Two companies have proposed construction of 42- to 48-inch natural gas pipelines from the Prudhoe Bay fields. One company proposes a route to terminate at a liquified natural gas shipping port near Gravina Point southeast of Valdez on Prince William Sound. Another company proposes a route to join a natural gas pipeline proposed for construction through the MacKenzie River Valley in northwest Canada. Twelve alternative routings for natural gas transport from Prudhoe Bay are proposed in the Primary Corridor System, as are other major pipeline corridors for transport of petroleum, natural gas and mineral slurries.

9. Utilities.

Except in the larger communities, sewer, water and electrical utilities are marginal or nonexistent. Electrical generation capability in the State in 1970 was more than 351,000 kw. Nearly half of this capacity was from steam-driven generators. Hydroelectric power generation provided approximately one-fourth of the overall capacity. Diesel and gas generators, primarily in rural communities, each provided one-eighth of the overall capacity.

A power grid tying the Anchorage-Kenai Peninsula area to Fairbanks has been proposed for several years. A number of hydroelectric generation sites have been identified across Alaska. Provision for transmission of electrical energy has been included within the proposed Primary Corridor System.

C. Freight Rates

Freight movement in Alaska has always been expensive. The terrain, the climate, and the vast distances are factors which have acted together to keep the rates high. Prior to the introduction of air freight, cargo moved via watercraft, pack animals, sleds, and foot. Overland transport was confined to trails as road development in Alaska has been minimal.

The introduction of roads, containerized ships and air freight have all contributed to a general lowering of costs.

D. Maintenance Costs for Selected Transportation Modes

Maintenance costs for the total State highway system were obtained from the 1972 edition of Highway Statistics published by the U.S. Department of Transportation. These data appear to show that costs in Alaska are similar to the national average. However, within Alaska, maintenance costs include both year around and seasonally-operated highways. Seasonally-maintained highways are those closed during the winter and total approximately 700 miles.

Similar information for Canadian gravel roads noted:

> Maintenance costs per mile listed for the Territories are those accounted for as maintenance expenditures. In actual fact, as some of these roadways deteriorate, they are reconstructed and costs are accounted for differently. Considering the fact, a reasonable estimate for trunk highway maintenance costs would be between $3,000 and $4,000 per mile. 1/

The higher cost per mile of maintained railroad reflects a higher standard required of rail transportation.

1/ Northwest Transportation Plan, 1972. p.20.

COMPARISON OF SELECTED TRANSPORTATION CHARGES

Mode	Cost/Ton Mile		
	Historic 1/	Canada 2/	Alaska 3/
Backpack	$25.00		
Dogsled	2.50		
Horse	12.00		
Wagon	.60		
Canoe	1.50		
Ship (Sternwheeler)	.05		
Rail	.08	0.01-.03	0.06
Highway (gravel)		0.06-.09	0.07
Highway (ice)		0.15-.20	0.282
Air (Hercules)			0.268
Slurry pipeline			0.0433 4/
Air-cushion vehicle			0.20 4/ -0.70 5/

1/ Source: A.H. Brooks, 1953. Blazing Alaska's Trails, Chapter XXII "Early Alaskan Transportation"
2/ Source: Northwest Transportation Plan, 1972
3/ Source: L. Pernela, University of Alaska, I.S.E.G.R., preliminary data
4/ Source: Optimum Transportation Systems to Serve the Mineral Industry North of the Yukon Basin in Alaska - M.I.R.L. Report #29
5/ Source: Transportation Geography: Comments and Readings, p. 278

MAINTENANCE COSTS OF SELECTED TRANSPORTATION MODES

Mode		Annual Cost Per Mile
Wagon road	(1926)	$ 300.00 1/
Sled road	(1926)	25.00 1/
Permanent trail	(1926)	10.00 1/
Flagged trail	(1926)	3.00 1/
Alaska Highway Net	(1972)	2,430.00 2,3/
National average	(1972)	2,420.00 2/
Canada average	(1972)	
2-lane paved		2,400.00 4/
2 lane trunk, non-paved		$3-4,000.00 4/
Alaska Railroad	(1969)	8,227.00 5/
Slurry pipeline		7,040.00 6/

1/ 1926 Annual Report, Alaska Road Commission.
2/ 1972 Edition Highway Statistics, U.S. Dept of Transportation.
3/ Excludes 700 miles of seasonally-maintained highway.
4/ Northwest Transportation Plan, 1972.
5/ Alaska Transportation Study, Interior Study No. 1, June 1970.
6/ Optimum Transportation Systems to Serve the Mineral Industry North of the Yukon Basin in Alaska - M.I.R.L. Report #29.

NATIONAL SECURITY IMPLICATIONS

A considerable portion of the existing highway net in Alaska is located on routes pioneered and later constructed and maintained under the auspices of military supervision and appropriations. These include the Valdez-to-Fairbanks highway connections which initially were military trails constructed in the Gold Rush Era for law enforcement purposes; and the Alaska Highway, a tremendous military construction program begun in 1942 under the urgency of global war.

Military needs have been considered in the suggested Primary Corridor System, but it appears that these needs will be largely served by air modes or by surface routes constructed for other purposes.

Assessment of the advantages and disadvantages of National security associated with the concentration of pipeline, rail, highway and other surface modes into consolidated corridors is not within the scope of this study.

RESOURCES:

Energy Related

oil

gas

Metalliferous

coal

geothermal

hydroelectric

A. OIL AND NATURAL GAS

1. Reserves.

The State of Alaska estimated in 1974 that, on and off-shore, a total of 86.6 billion barrels of oil and 469.4 trillion cubic feet of gas would be ultimately recoverable in Alaska. These reserves include estimated discovered reserves and estimated speculative reserves; the latter is defined as yet undiscovered reserves which after discovery can be reasonably expected to be produced.

Estimated discovered reserves to date are 10.5 billion barrels of oil (BO) including 10 billion BO in the Prudhoe Bay field; and 29.7 trillion cubic feet of gas (TCF), including 26 TCF of gas in the Prudhoe Bay field.

Sedimentary onshore basins and offshore provinces, in addition to the estimated discovered reserves, are estimated to contain 76.1 billion BO of speculative recoverable oil and 439.7 TCF of speculative recoverable gas.

2. Demand.

Present estimates of worldwide demand for crude oil approximately 21 billion BO per year, and estimates for the year 2000 are approximately 50 billion BO per year. This represents an annual growth rate of over 3.5 percent.

United States demand for crude oil in 1968 was 3.3 billion BO, which was approximately 24 percent of the total worldwide demand. Forecasts for the year 2000 are in the area of 11.8 billion BO. Overall, somewhere on the order of 3 percent annually is the expected average growth rate for the nation.

The exploration, development and production of Alaska's vast oil and gas resources relates directly to all phases of the economic and social development of the entire State.

ESTIMATED DISCOVERED AND SPECULATIVE PETROLEUM POTENTIAL FOR ALASKA SEDIMENTARY PROVINCES

PROVINCE	RECOVERABLE BARRELS OF OIL (in billions)		RECOVERABLE CUBIC FEET OF GAS (in trillions)	
DISCOVERED:		10.5		29.7
SPECULATIVE ONSHORE:				
1. North Slope	15.5		41.8	
2. Kotzebue*	.7		5.0	
3. Koyukuk	3.4		9.3	
4. Bethel	1.3		3.5	
5. Bristol	.9		6.8	
6. Yukon-Kandik	1.7		11.4	
7. Copper	.2		1.2	
8. Cook Inlet*	2.5		18.4	
9. Other	.2		1.1	
Subtotal		26.4		98.5
SPECULATIVE OFFSHORE:				
1. Beaufort	2.7		13.5	
2. Chukchi	6.6		33.0	
3. Hope	1.8		13.0	
4. Bering Sea	27.4		200.0	
5. Kodiak Island	2.4		17.5	
6. Gulf of Alaska*	8.8		64.2	
Subtotal		49.7		341.2
GRAND TOTAL		86.6		469.4

*includes onshore and offshore areas.

All Alaskan crude oils discovered to date are generally classified as having superior quality characteristics, i.e., low sulphur content ("sweet" crude) and moderate to high A.P.I. gravity. Low sulphur crudes are more desireable for refining purposes which adds to the feasibility of expanding and building refineries in Alaska for local use and for export.

Present Alaska demand for crude oil is dependent on refining capacity. As of June, 1974, refining capacity in the State was approximately 57,300 BO per day, and consists of three operating plants:

Standard Oil Company of California

Kenai Refinery, located at North Kenai. Processes 20,000 BO per day. Crude oil throughput obtained from production from Swanson River Field.

Tesoro Petroleum Company

Alaskan Refinery, located at North Kenai. Processes 31,000 BO per day. Crude oil throughput obtained by purchasing State of Alaska royalty oil.

Atlantic Richfield Company

Prudhoe Tapping Plant, located at Prudhoe Bay Field. Processes 6,300 BO per day. Crude oil throughput is obtained from one well in the Prudhoe Bay Field, which is operated for the exclusive purpose of providing feedstock for the refinery.

Products from these three refineries are marketed locally in Alaska and are supplemented by imports from other refineries on the West Coast. Alaska's current production of approximately 200,000 BOPD, primarily from the Cook Inlet Basin, far outstrips the refining capacity of 57,300 BOPD.

Daily production will increase dramatically in three years, when the Trans-Alaska Pipeline will allow production from closed-in wells at Prudhoe Bay. Initial production scheduled at 1.2 million BOPD is anticipated to increase to 2.0 million within the following two years. The latter production figure is 40 times greater than the current limited refinery capacity in Alaska.

Alaska demand for crude oil is directly related to the refining capacity of plants within the State. Since there are no imports of crude oil into the State, it can be assumed that production (supply) is currently ahead of demand. There is no question that the demand trend for crude oil in Alaska could escalate to whatever limits one saw fit to impose.

However, Alaska demand for crude oil should not be mistaken with Alaskan demand for finished products. Alaska demand for refined crude oil products will increase substantially in the next few years and will result in new construction to greatly expand the crude oil refinery capacity within the State.

Additionally, effective utilization of the abundant supply of raw natural gas in Alaska would dictate new construction of petrochemical plants or manufacture of fertilizer should there be a substantial increase in agricultural production in Alaska; or perhaps industrial plants, i.e., aluminum or copper smelters, requiring a reliable energy source.

Such plant sites are anticipated to be located at established multimodal transportation corridors such as Fairbanks,where air, highway and rail provide excellent movement alternatives; or at or near all-weather port areas in the vicinity of the Alaska Peninsula, Cook Inlet and Gulf of Alaska coastlines. This conclusion has a bearing on the location of Primary Corridors to transport petroleum resources from producing areas to such plants.

3. Primary Corridor Needs.

Oil and gas pipeline routes should be located to best

serve the larger and more attractive geologically defined sedimentary basins and offshore provinces. Throughout Alaska, the largest and most attractive oil and gas basins are located onshore near the coast, or, offshore. By comparison, interior basins have thinner, or less, sedimentary deposits and should not contain as prolific oil and gas reservoirs.

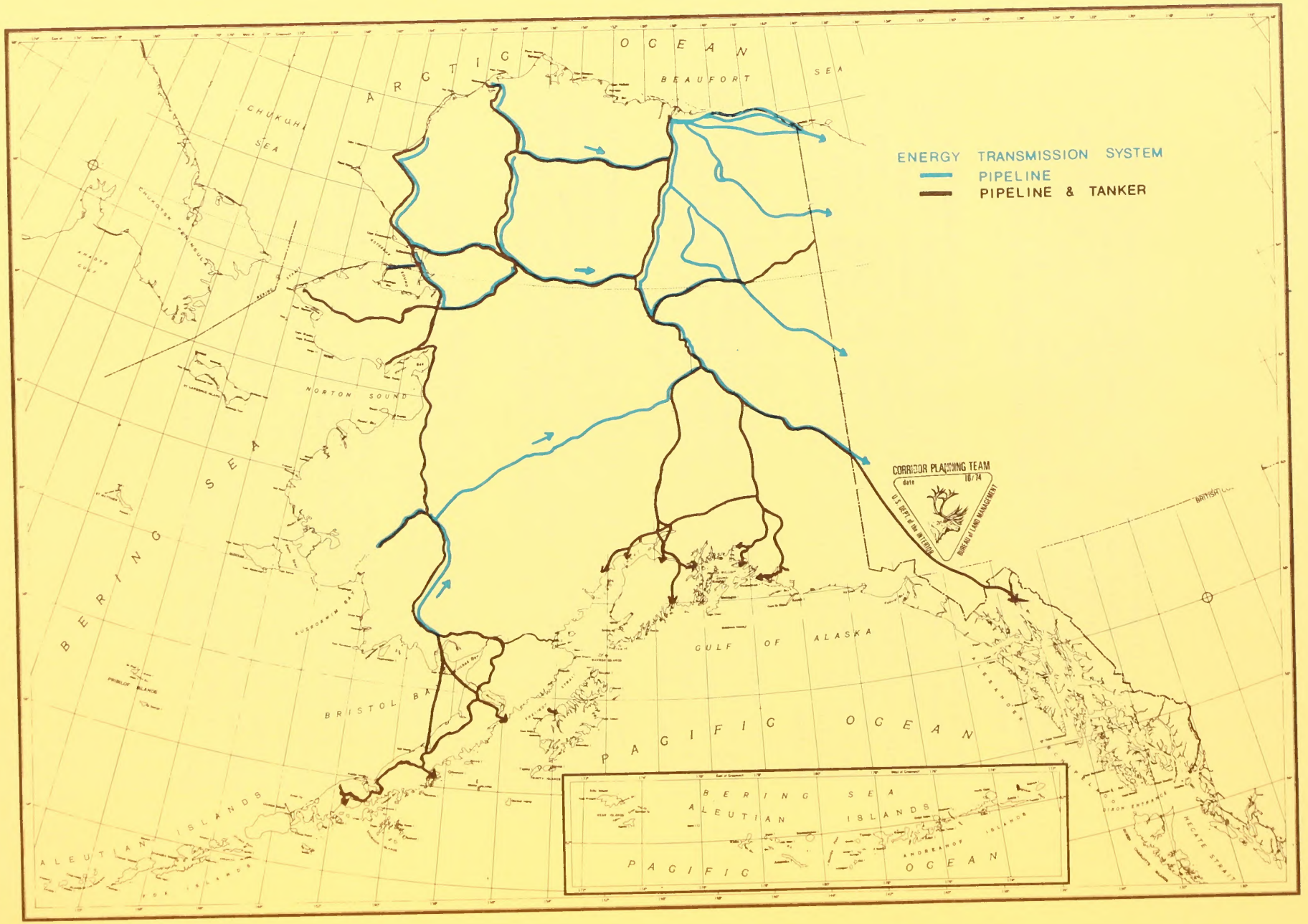
The Trans-Alaska Pipeline corridor will serve effectively the Prudhoe Bay Field discovery and other potential reserves in the North Slope Basin east of Petroleum Reserve Number Four, the offshore Beaufort Province, as well as the interior basins of Yukon Kandick, Middle Tanana and Copper River. This is approximately $\pm$ 17 percent of the estimated 86.6 billion BO potential ultimate recovery credited to all of Alaska.

To the south, the Cook Inlet Basin is credited with ultimate recovery of 3.0 billion BO, Kodiak Island Province potentially 2.4 billion BO, and Gulf of Alaska Province 8.8 billion BO. This is approximately $\pm$ 17 percent of the estimated potential ultimate recovery credited to all of Alaska.

Therefore, the remaining 66 percent of Alaska's potentially recoverable oil reserves lie in the basins or provinces along the north west and western coast, stretching from the Chukchi Province and western North Slope (including Petroleum Reserve Number Four) down to the Bristol Basin and the shores of the Alaskan Peninsula.

Extensive crude oil and companion natural gas pipeline systems will be required to gather and transport these northern and western reserves.

The anticipated volumes of crude oil in Alaskan deposits are considerably larger than the intended capabilities of the transshipment of 10 billion barrels of oil from the Trans-Alaska pipeline terminal at Valdez or proposals to move 26 trillion cubic feet of natural gas from the Prudhoe Field. (Prudhoe Field reserves represent less than 12 percent of the total Alaskan estimated recoverable crude oil and less than 6 percent of the natural gas). It is doubtful that only one mode of transportation


ENERGY TRANSMISSION SYSTEM
PIPELINE
PIPELINE & TANKER
ARCTIC OCEAN
BEAUFORT SEA
CHUKUH SEA
NORTON SOUND
BERING SEA
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
CORRIDOR PLANNING TEAM
date 10/74
U.S. DEPT. of the INTERIOR
BUREAU of LAND MANAGEMENT
BERING SEA
ALEUTIAN ISLANDS
PACIFIC OCEAN

can satisfy social, safety, economic and environmental requirements, e.g. what additional volumes of crude oil can be moved by ship to Washington, Oregon and California before it becomes necessary to construct new, high volume transportation systems to the Midwestern and Eastern United States?

One approach to these land use planning decisions would be to restrain all future Alaskan production of oil and gas until the designed capabilities of the Trans-Alaska Pipeline System, including its receiving areas in Washington, are in excess of later production at the Prudhoe Field. Due to the existing short-fall of energy -- especially natural gas -- in the conterminous United States, it does not appear new production in Alaska will await on-line capabilities. Delays in the production and movement to market of oil and gas from new Alaskan fields may also create inequities among the various Native Regional Corporations and the State of Alaska when lands are selected on the basis of prospective oil and gas values.

Accordingly, the proposed Primary Corridor System maintains options to link:

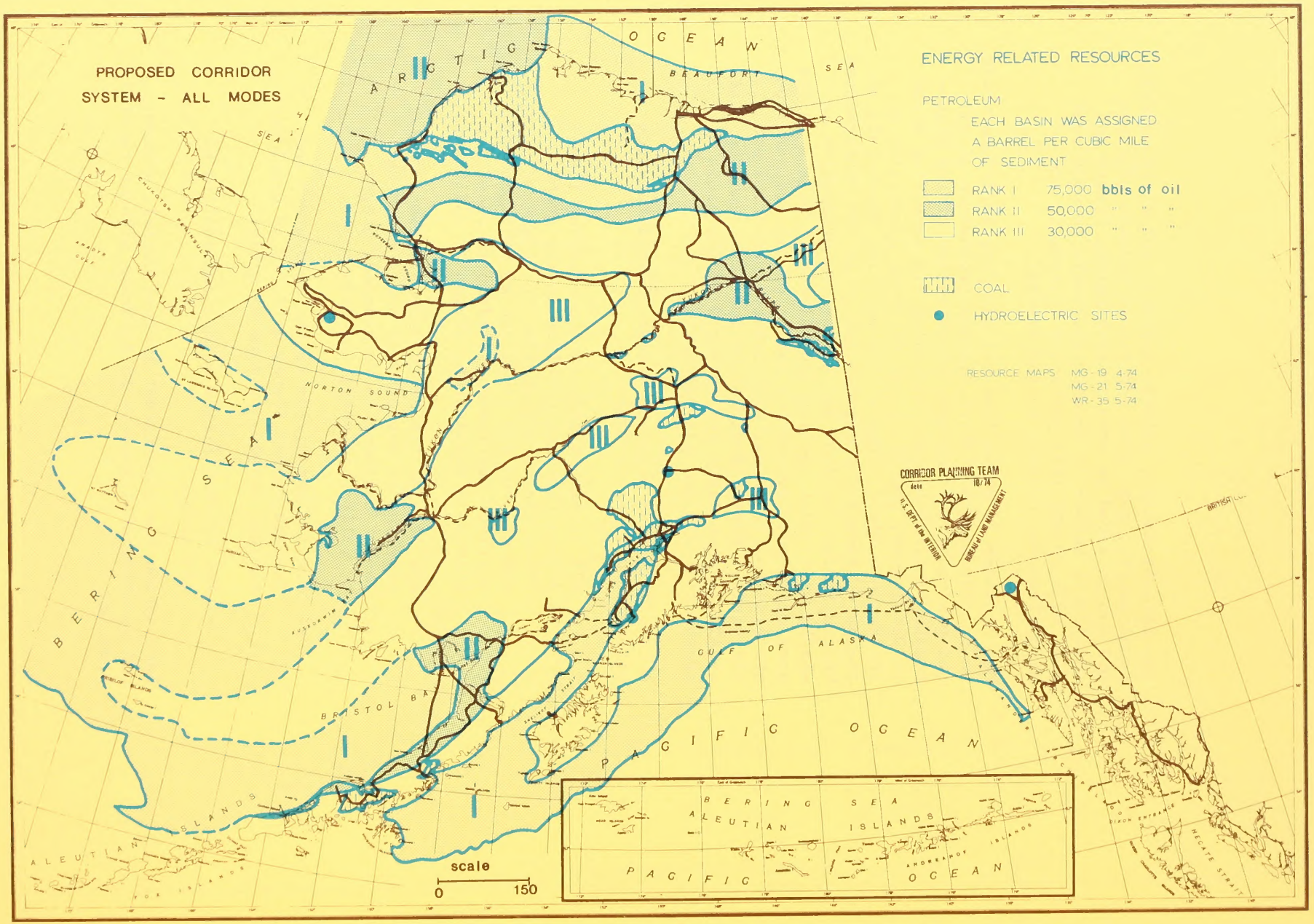
-- All Alaskan fields to the existing Trans-Alaska Pipeline Corridor in the event these fields are smaller in volume or new oil and gas lines can be built in the corridor and there are adequate receiving points in Washington, Oregon or California;

-- New Alaskan fields by a combination of pipeline to one or more ports and then tanker shipment to Washington, Oregon or California receiving areas;

-- New Alaskan fields to the Midwestern and Eastern United States directly by pipeline through Canada, or more probably;

-- New Alaskan fields with a combination of the above.

Each option has significant adverse social, economic, and environmental impacts on Alaskans without careful planning.


PROPOSED CORRIDOR
SYSTEM - ALL MODES
ENERGY RELATED RESOURCES
PETROLEUM
EACH BASIN WAS ASSIGNED
A BARREL PER CUBIC MILE
OF SEDIMENT
RANK I 75,000 bbls of oil
RANK II 50,000 " " "
RANK III 30,000 " " "
COAL
HYDROELECTRIC SITES
RESOURCE MAPS MG-19 4-74
MG-21 5-74
WR-35 5-74
CORRIDOR PLANNING TEAM
date 10/74
U.S. DEPT. of the INTERIOR
BUREAU of LAND MANAGEMENT
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
ANADYR GULF
CHUKOTSK PENINSULA
NORTON SOUND
ALASKA
BERING SEA
BRISTOL BAY
KUSKOKWIM
PRIBILOF ISLANDS
ALEUTIAN ISLANDS
GULF OF ALASKA
PACIFIC OCEAN
BRITISH C.
DIXON ENTRANCE
HECATE STRAIT
scale
0 150
BERING SEA
ALEUTIAN ISLANDS
PACIFIC OCEAN
ANDREANOF ISLANDS

B. COAL

1. Reserves.

Coal reserve estimates totaling more than 130 billion tons, or about 8 percent of the U.S. reserves have been made for seven Alaskan coalfields; The Northern, Nenana, Jarvis Creek, Broad Pass, Susitna, Matanuska, and Kenai fields.

The Northern Field, where coal is believed to underlie continuously about 30,000 square miles, contain 92 percent of Alaska's total estimated reserves.

Coal deposits in several other localities are known, but either data is lacking on which to base reserve estimates, or the coal-bearing rocks are so structurally complex that economic mining appears impossible during the foreseeable future. Reserve estimates for the Nenana, Matanuska, and parts of the Susitna field, where detailed geologic mapping and some exploration have been accomplished are believed reasonably accurate. Elsewhere it is doubtful that the estimates express even the general order of magnitude. Recent exploration by private industry in the Chuitna River and Capps Glacier districts of the Susitna field undoubtedly have increased the quantity and quality (inferred to an indicated or measured status) of reserve estimates, but such an increase probably has little effect on a total reserve number of 130 billion tons magnitude.

2. Demand.

Worldwide and U.S. recoverable coal resources are considered more than adequate to meet all foreseeable requirements. World production of coal in 1971 totaled 3.295 billion tons whereas U.S. coal production in 1971 was just under 561 million tons, and in 1973 was 590 million tons. Alaska's share of U.S. production in 1973 was approximately 700 thousand tons or 0.12 percent of the U.S. total.

U.S. coal production is expected to triple by 1985, reaching almost 2 billion tons per year. The degree of urgency to develop coal reserves in Alaska is not as great as for Alaska's petroleum reserves.

3. Primary Corridor Needs.

The energy crisis renewed interest in coal all over the United States, and particularly in Alaska. Alaskan coals,

like their liquid and gaseous hydrocarbon cousins,are desireably low in sulfur content. However, they are high in moisture and ash. Past plans for utilization of known reserves of coal included blending for coking purposes and utilization for a uranium enrichment plant, both large scale operations. There is a possibility for local coal use in Alaska as a substitute for more scarce natural gas, which is now used for generation of electricity, and home and industrial heating. Power plants in the Western United States are also seeking more reliable supplies of fuel than oil or natural gas for production of electricity. Alaskan coals could possibly become economically competitive and go into large scale production before the year 2001.

Accordingly, the proposed Primary Corridor System provides options for movement of Alaskan coal. Both rail and slurry pipelines have been recommended as primary modes for movement of Alaskan coal from the huge deposits in northwestern Alaska. Slurry pipelines suggest needs for further shipment by boat or barge. The rail mode will become especially attractive if a direct linkage to the Canadian rail system and conterminous United States becomes reality. Rail also provides options for movement of people and other products in a two way manner; whereas, slurry pipelines tend to be one-way with adaptations possible only in the fluid medium used to transport the pulverized coal (oil instead of water).

C. HYDROELECTRIC POWER

1. Hydroelectric Potential.

Hydroelectric power potential is widespread throughout Alaska, occurring in all regions except the Arctic and the Aleutian subregions.

The USDI Alaska Power Administration has identified 76 potential hydroelectric sites of 2,500 kw or larger continuous electrical energy. These major hydroelectric potentials have a combined annual production in excess of 31.9 million kw of installed capacity.

A brief breakdown, by geographical areas of the hydroelectric potentials, is as follows:

Southeast - 2,767,000 kw potential installed capacity.

Southcentral - 8,019,000 kw potential installed capacity.

Southwest - 2,936,000 kw potential installed capacity.

Interior - 17,568,000 kw potential installed capacity.

Northwest - 686,000 kw potential installed capacity.

2. Demand

World demand is not applicable as electrical energy is not considered an exportable product. However, world demand for energy and need to conserve non-renewable fossil fuels, has strengthened the need to develop renewable energy sources such as hydroelectricity.

Recent and future Alaska electrical power demand 1/ is given in the following tabulation:

RECENT AND FUTURE DEMAND IN ALASKA FOR ELECTRICAL ENERGY

Year	Peak Demand 1000 kw	Annual Energy Million KWH
1972	562	2,669
1980	1,440	7,130
1990	2,650	13,280
2000	5,260	27,520

Alaskan hydroelectric demand in the immediate future and beyond is fluid. Local prospects exist for development of reliable hydroelectric energy in the Railbelt area between Anchorage, Fairbanks, Seward and Homer. Accelerating oil and gas development activities will directly effect economic and social growth and energy use, but to a degree that cannot presently be defined. The recent vote to eventually relocate the State Capitol to a new site in central Alaska creates more uncertainty in defining real future demands for hydroelectric power.

3. Primary Corridor Needs.

Within the time framework of 2001, the following hydroelectric projects are sufficiently advanced in the planning phases to

1/Alaska Power Survey, Future Power Requirements draft, November 1973.

warrant corridor considerations for high-voltage power transmission lines:

1. Susitna project

2. Bradley Lake

3. Tuksuk Gorge

4. Yukon-Taiya

Transmission lines from these projects have been identified in the suggested Primary Corridor System.

D. GEOTHERMAL

1. Reserves.

Alaska is widely covered by identified inferred geothermal resources, but actual distribution, extent, and magnitude of these resources are not well defined. General locations can be inferred from distribution of hot springs, volcanoes, and young volcanic rocks in geo-pressured zones.

2. Demand.

Geothermal resources are by their nature not exportable products. Limited world-wide development has existed since the turn of the century. In the United States, there has been small commercial geothermal development concentrated in California since about 1960.

3. Exploration and Development.

Exploration and development of the geothermal resources are similar to oil and gas production operations except the end product is steam under pressure. The extent and potential lifespan of the geothermal reservoir must be evaluated carefully before development takes place.

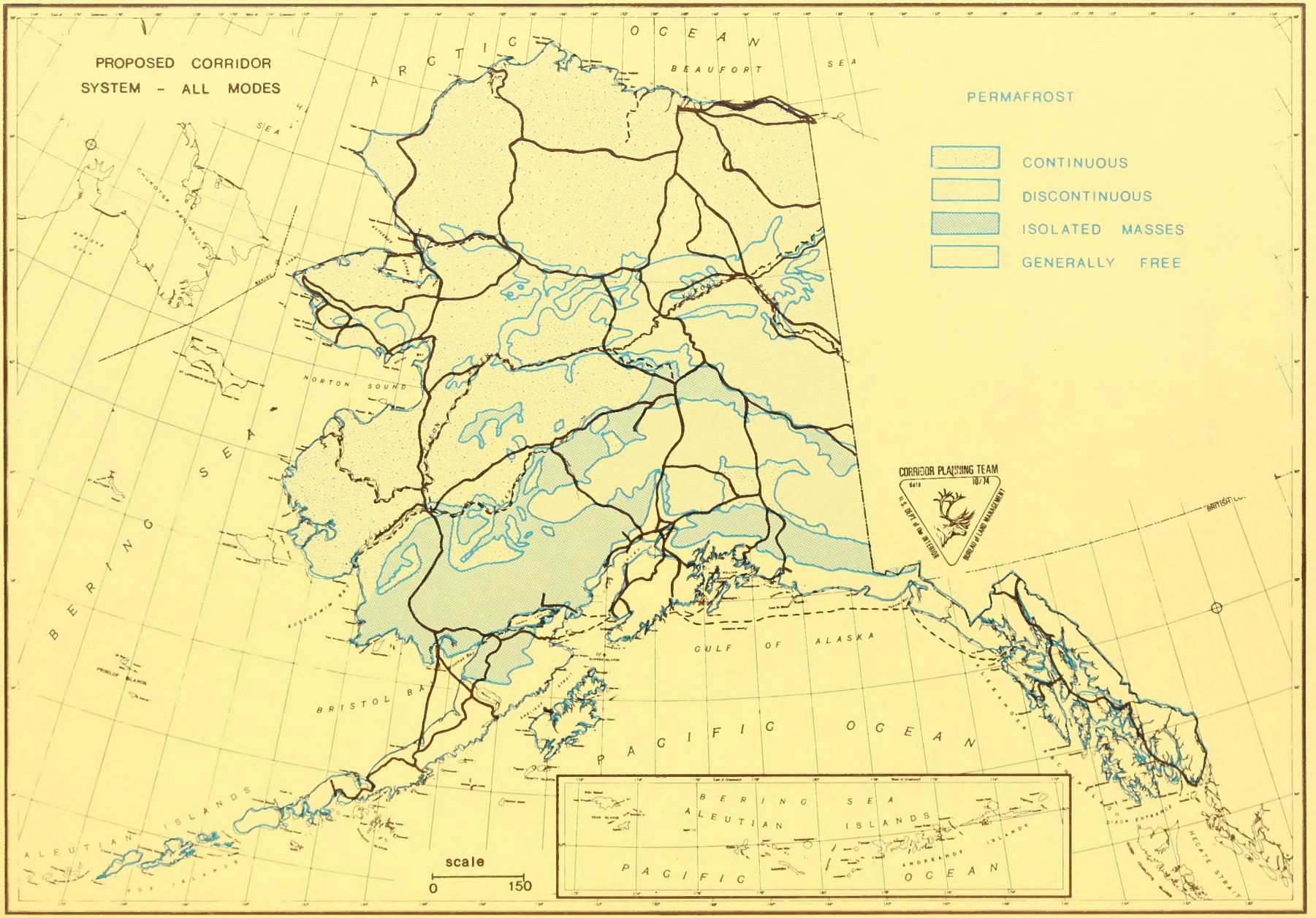
Geothermal steam is used to drive low-pressure steam turbine systems. These plants must be constructed at the geothermal field as heat loss makes transportation of steam impractical over distances of more than a mile. Installation of electrical power generation and transmission facilities requires multi-million dollar investments. All geothermal power plants installed to

date have been small compared to hydroelectric or steam-electric installations and have not exceeded 110 megawatts at an individual site. By-product processing plants, by-product facilities, and facilities for disposal of waste liquids may also be needed at a geothermal site.

4. Primary Corridor Needs.

Development of geothermal energy throughout Alaska by 2001 does not appear to be of sufficient magnitude to warrant corridor designation for transmission lines except on the Alaska Peninsula where there is a high incidence of geothermal potentials combined with prospective oil and gas transshipment and processing plants.

Accordingly, the suggested Primary Corridor System provides for the transmission of electrical energy along the Alaskan Peninsula.


PROPOSED CORRIDOR SYSTEM - ALL MODES
PERMAFROST
CONTINUOUS
DISCONTINUOUS
ISOLATED MASSES
GENERALLY FREE
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
NORTON SOUND
BERING SEA
BRISTOL BAY
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scale
0
150
BERING SEA
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PACIFIC OCEAN

PERMAFROST AND SOILS IN CORRIDOR AREAS

A. Permafrost

Permafrost, or permanently-frozen ground, is found in most of Alaska except in the southern coastal areas. Permafrost is defined by Muller (1947) as "thickness of soil or other surficial deposit or even of bedrock, at variable depth beneath the surface of the earth in which a temperature below freezing has existed continuously for a long time - from two to ten thousands of years." Permafrost reaches to depths of 2,000 feet in the Arctic region.

Shading and insulation favor the formation and continuation of permafrost. Permafrost limits the rooting depths of plants, prevents internal soil drainage, and forces water drainage over the surface to accumulate in peaty material and depressions. This continued wet condition creates marsh and tundra and increases insulation and freezing depth. The "active layer" is the depth to which the soil thaws each year, varying from a few inches to several feet.

The three general approaches used in any type of construction in permafrost regions are: 1. If possible, avoid construction in areas of permafrost. 2. Eliminate permafrost in areas having thin layers of permanent ice through stripping or removal of vegetative cover or upper layer of soil. The depth of thaw during the summer can then be increased and permafrost effectively eliminated over a period of years. 3. Building structures on piling so that heat from the structure will not thaw the ground surface. Buildings, roads and airports can also be constructed on gravel pads to insulate the underlying permafrost from summer thaw. Refrigeration through the burial of freezing units is another method used to preserve permafrost.

Permafrost is an important natural occurrence that must be considered in all of man's activities in the North. The presence of permafrost also makes the environment "fragile" in many areas.

Permanent ground ice has several forms depending upon climate, soil texture, moisture content and landform. Ice wedge polygons are most common in the Arctic and Interior regions. Solifluction slopes (flowing soils) are common on hills and mountains along the northwest coast and in the Arctic. Low mounds caused by frost action are extensive throughout the western coastal plains. Isolated masses and lenses of ice occupy deep silts on low slopes

in the Interior. Ground ice in well-drained upland soils of hills and mountain slopes exists in granular form and has less effect on construction than other forms. The types of permafrost are noted in the descriptions for each principal soil type which follow:

B. Soils

Information on soils and the underlying material is essential to the planning of a system of Primary Corridors for individual modes of transportation and utility facilities through the State. The physical conditions of soils and underlying materials affect construction of roads, trails, or structural features on the surface and the impact of such construction on the existing environment.

The following soil descriptions include the major soils within the Primary Corridor network proposed in this report and are taken from the recent Interim Report on the Exploratory Soil Survey of Alaska by the Soil Conservation Service presented to the Land Use Planning Commission in 1973.

1. Soils of River Terraces.

These soils within most areas of the State are well drained and composed of interstratified gravel, sand, silt and organic matter. Limitations for construction of highways, rail lines or utilities are moderate with a flood hazard. Permafrost is absent.

Peat deposits and wet silty soils of depressions on terrace form a complex land pattern which affects route selection. These latter types have shallow permafrost.

2. Poorly-drained soils of coastal plains and Interior valleys.

These are the most extensive in Alaska, occuping coastal plains in the Arctic, Western and Southern Alaska, a large portion of the Interior valleys and slopes of the surrounding mountains. Textures of the soil vary from gravelly to clayey loams.

These soils are wet with shallow permafrost and an 8 to 24 inch depth of organic mat over the surface. Permafrost is shallow under this insulating mat. Limitations for all uses of these soils are severe. Vegetative cover is wet to moist tundra and

low brush on upland slopes, with high brush and black spruce in the valleys. Many segments of the proposed Corridor System will be routed over these soils throughout the State.

3. Well-drained upland soils.

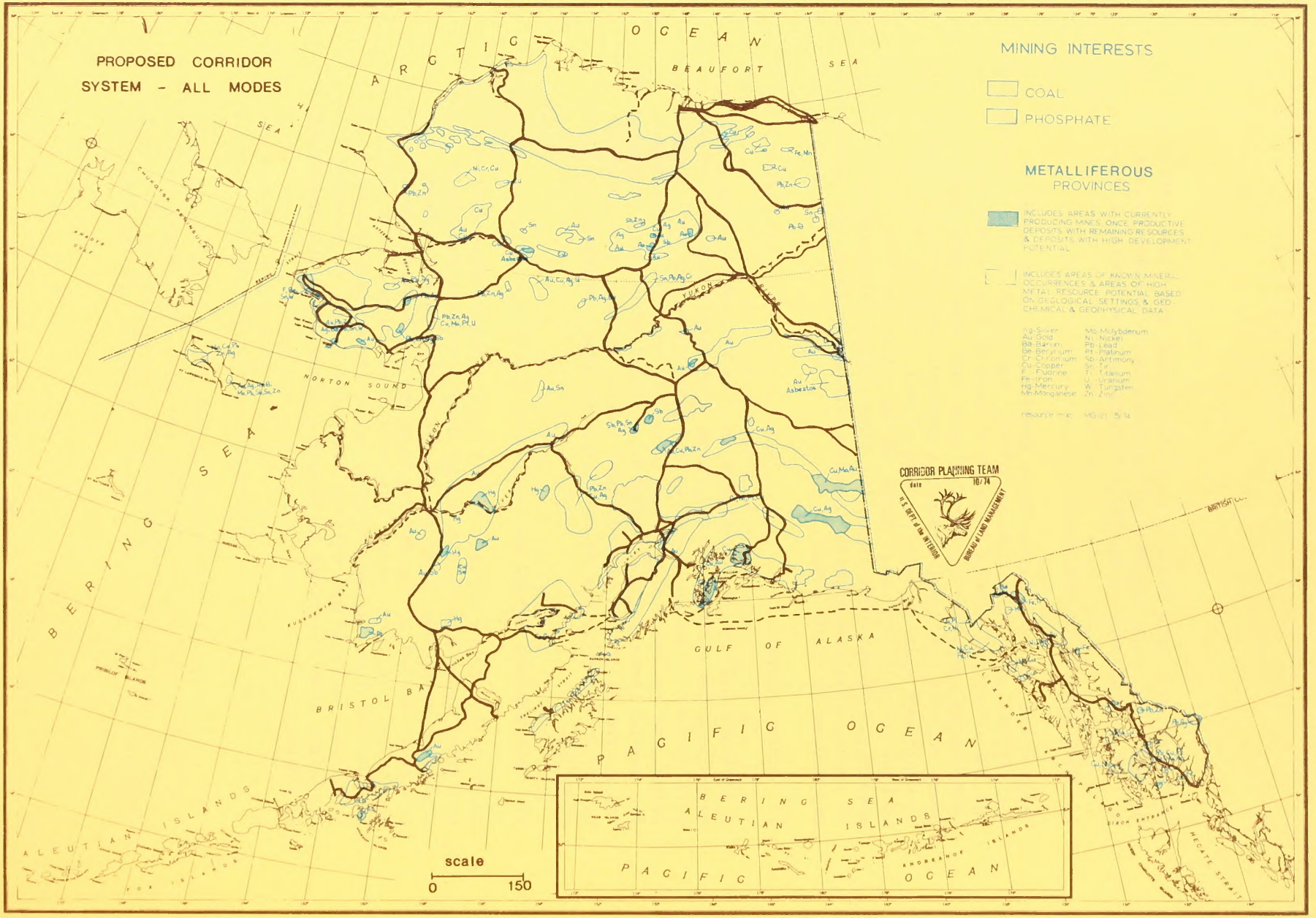
These soils are permafrost-free, gravelly to silty soils of the slopes, supporting spruce, birch, and aspen in the Interior, and low brush and tundra on south slopes of the Brooks Range. Textures are gravelly on steep slopes, are moderately deep loamy to silty on lower slopes of valleys, and silty to loamy on windblown silt deposits, along rivers. Natural fertility is high on valley sites. These upland soils are moderately erodible. Limitations for using these soils in construction of roads, railbeds or utility lines are moderate on low slopes and severe in steep areas.

4. Arctic slopes.

A dominant soil on Arctic slopes is a dark-colored loamy to gravelly soil of moderate thickness with deep permafrost on well-drained steep upper slopes and poorly-drained with shallow permafrost on lower slopes and in valley bottoms. Limitations for use of these soils in highway; railbed or utility construction range from slight on well-drained slopes at high elevations to severe on steep slopes or in valley bottoms. Erodibility is moderate.

5. Well-drained upland acid soils.

These soils occupy uplands in the Cook Inlet-Susitna lowland, northwest foothills of the Alaska Range, central Kuskokwim highlands along the lower Yukon, and scattered areas from the south slopes of the Brooks Range to the Coastal Chugach Mountains. Textures range from silt loams to gravelly sand. Limitations for the use of these soils in construction of highways, railbeds and utility lines are slight to moderate depending upon steepness of slopes. These soils are moderately erodible.


PROPOSED CORRIDOR
SYSTEM - ALL MODES
MINING INTERESTS
COAL
PHOSPHATE
METALLIFEROUS
PROVINCES
INCLUDES AREAS WITH CURRENTLY PRODUCING MINES, ONCE PRODUCTIVE DEPOSITS WITH REMAINING RESOURCES & DEPOSITS WITH HIGH DEVELOPMENT POTENTIAL
INCLUDES AREAS OF KNOWN MINERAL OCCURRENCES & AREAS OF HIGH METAL RESOURCE POTENTIAL BASED ON GEOLOGICAL SETTINGS & GEOCHEMICAL & GEOPHYSICAL DATA
Ag-Silver
Au-Gold
Ba-Barium
Be-Beryllium
Cr-Chromium
Cu-Copper
F - Fluorine
Fe-Iron
Hg-Mercury
Mn-Manganese
Mo-Molybdenum
Ni-Nickel
Pb-Lead
Pt-Platinum
Sb-Antimony
Sn-Tin
Ti-Titanium
U-Uranium
W-Tungsten
Zn-Zinc
resource map MG-01 5/74
CORRIDOR PLANNING TEAM
Date 10/74
U.S. DEPT. OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
NORTON SOUND
BERING SEA
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
YUKON
BRITISH COL.
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METALLIFEROUS MINERALS

Geologically, Alaska is suitable for many major metalliferous deposits, but available information is not adequate to determine extent or location of these mineral resources. Accurate assessment of potential reserves and the extent of metallic mineralization over large areas awaits extensive prospecting and exploration by geologists and engineers.

Known, proven reserves of minerals in Alaska generally do not warrant the cost of building major new roads or extension of rail service. Combined with inferred speculative resources, however, reasonable provisions for transportation appear very desirable.

A. Demand.

Demand for metalliferous minerals depends on demand for metals and the end products using metals, which is influenced by price, quality, reliability of the source of supply, availability of existing or potential substitutes, and other factors.

International competition for world mineral supplies, which are non-renewable resources, continues to grow. Development of Alaska's oil and gas reserves may make Alaska both a developmental area and a viable market for Alaska's own mineral resources. At present, transportation of finished steel products for petroleum development from production sites to Alaska greatly increases costs and time lag between placement of orders and receipt of finished products.

B. Primary Corridor Needs.

Numerous areas of Alaska may warrant roads or railroads for metallic mineral development in conjunction with development and transport of crude oil and natural gas. In some cases, slurry pipelines may provide for economical movement of large volumes of mineral products to central processing or transshipping points.

The Kobuk copper-zinc province is one area having high prospective value for mineral development. Geologic data are now available to make reasonable inferences that there are sufficient deposits to justify production. However, there is not enough data on the overall regional potential, to justify the costs of roads, railroads, or other transportation without public subsidy.

Local energy resources (i.e. coal, hydroelectric, oil and gas) can be made available in interior Alaska for smelter plants. Availability of energy is important to production of metalliferous minerals as cost of moving concentrated mineral products is less than unprocessed ore.

The proposed Primary Corridor System considers locations which enhance areas having high prospective value for mineral development in the near future.

AGRICULTURAL AND TIMBER RESOURCES

A. Agricultural

The present agricultural industry in the state is limited to one percent of the land identified as potentially suitable for production. In 1972, the Alaska Crop and Livestock Reporting Service estimated there were 310 farms with a total combined size of about 72,000 acres, of which about 18,000 acres was in crops, with the remainder in pasture and uncleared lands.

The annual value of crop and livestock production for four areas under cultivation during 1972, according to data from the Alaska Rural Development Council,is as follows: Matanuska Valley, $4,421,400; Tanana Valley, $864,800; Southwest-Kodiak, $232,200; and Kenai Peninsula, $215,200.

Agricultural products of the Matanuska and Tanana Valley areas presently include cool season vegetables, berries, potatoes, milk, forage, and small grains for Alaskan markets. The potential for commercial vegetable processing and grass seed production in these areas is high. The Yukon Flats area has high prospective potential for growing forage and small grain crops. Large grassland areas of coastal Alaska from the Kenai-Kodiak area to the islands in the eastern Aleutians are suitable for production of beef, mutton, and wool. Reindeer grazing range extends from the eastern Arctic across the North Slope and down the west coast to the Goodnews Bay area and has an estimated carrying capacity of over 150,000 animals per year.

Alaska has four areas with a combined total of 9.5 million acres having a favorable combination of soils, moisture, and climate and where 50 percent or more of the area is suitable

for crop or forage production:

1. Yukon Flats, 5,282,000 acres.

2. Central Yukon-Tanana, 590,000 acres.

3. Cook Inlet-Susitna, 2,542,000 acres.

4. Kenai Peninsula, 1,090,000 acres.

In addition, five other Alaskan areas with high production potential where 25 to 50 percent of the total area suitable for crops comprise an additional 15.1 million acres as follows:

1. Central Yukon-Tanana, 9,335,000 acres.

2. Lower Yukon, 1,870,000 acres.

3. McGrath-Kuskokwim area, 2,024,000 acres.

4. Cook Inlet, 177,000 acres.

5. Bristol Bay, 1,747,000 acres.

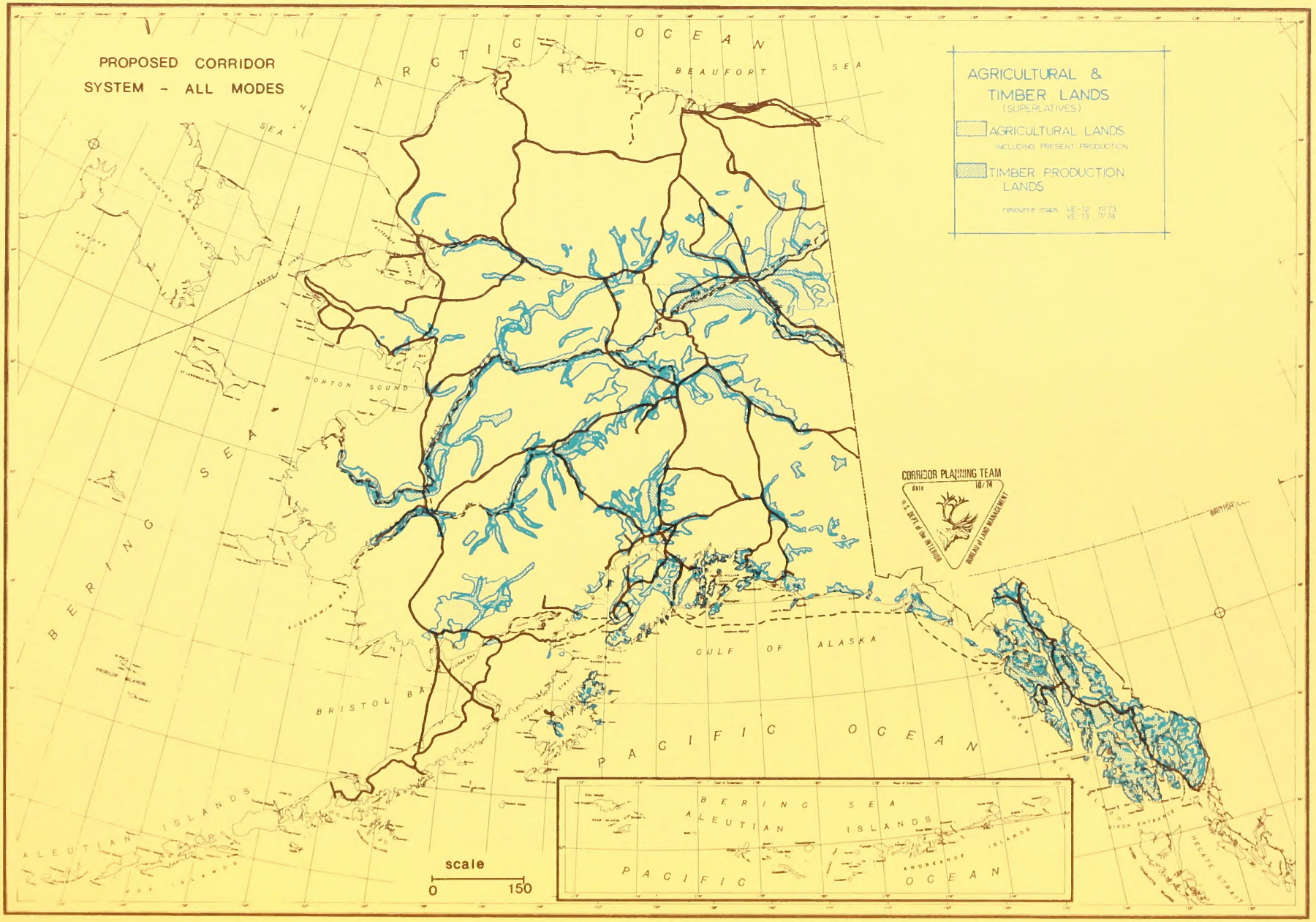
Another 9 million acres of land in Alaska is marginally suitable for agriculture. Grass and tundra uplands on the Kenai Peninsula, Kodiak and Aleutian Islands have potential as grazing land for domestic livestock.

Future development of commercial agriculture in Alaska is related to increased utilization of other resources in the state and future demands for agricultural products which can be produced in the subarctic. Need to supplement food supplies during periods of world shortages or shortages in undeveloped nations may spur development of Alaska's agricultural potential. Since economical means of transporting large volumes of foodstuffs to market depends on ease of access, these values are considered in the suggested Corridor Planning System.

B. Timber

Timber harvest in the spruce hemlock coastal forests extending from Kodiak to Icy Bay is increasing in response to local and foreign market and demands. Similar forests in Southeast Alaska Icy Straits are currently the largest producers of commercial timber in the State, providing rough lumber, cants, pulp, and other timber products to world markets.

Commercial forest producing lands in Interior Alaska are confined primarily to river valleys, with limited acreage on favorable sites in adjacent uplands. An estimated 22,469,000


PROPOSED CORRIDOR
SYSTEM - ALL MODES
AGRICULTURAL &
TIMBER LANDS
(SUPERLATIVES)
AGRICULTURAL LANDS
INCLUDING PRESENT PRODUCTION
TIMBER PRODUCTION
LANDS
resource maps VE-12 11/73
VE-13 7/74
CORRIDOR PLANNING TEAM
date 10/74
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ARCTIC OCEAN
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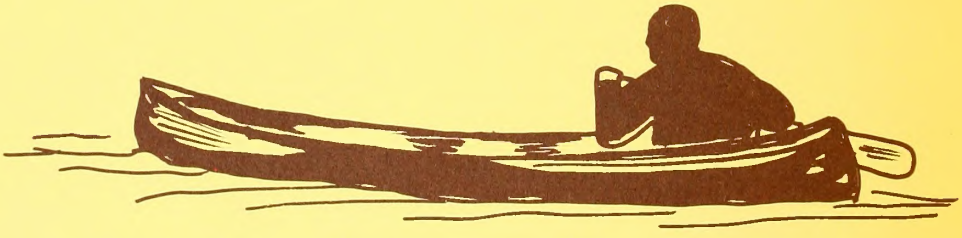
acres of the Interior, including upper Cook Inlet, have a prospective yield of 130 million board feet of timber per year.

Present production of rough timber and logs is limited to a few areas along the Kuskokwim, Tanana, Yukon Flats and Matanuska River areas. With the advent of increased urban and rural development throughout the Interior and increased foreign demands, this renewable timber resource could be utilized to a greater extent in providing construction materials, logs, chips, and other wood products for regional and Statewide use.

Many of the Primary Corridor routes extend through river valleys or parallel or intersect areas where the potential for timber production is high.

RESOURCES:

Recreation Related



RECREATION-RELATED RESOURCES

Outdoor recreation and tourism are important to the economy of Alaska. In 1971 tourists spent an estimated $45 million in Alaska. 1/

Inventory information on recreation resources is based on the Bureau of Land Management's recreational inventory system. The basic concept of this system is that the natural and cultural resources have "inherent" recreational use values that can be measured without considering location, existing or potential use levels, existing management systems, withdrawals, or proximity to roads, population centers, etc. This inherent value is measured entirely from the recreation user's point of view without considering the effect the use being evaluated has on the resource or other resource use. The basic system was modified to some degree to make it more useful in undertaking a state-wide inventory of Alaska's vast expanse and limited availability of information.

Quality ratings are based on the resource conditions as they exist during the season of use. Three ratings were used for the State: high, good, and low.

For purposes of this report, prime consideration is given to superlative areas having high or good ratings. Values considered are (1) scenic, (2) natural features, (3) historic sites, and (4) primitive lands.

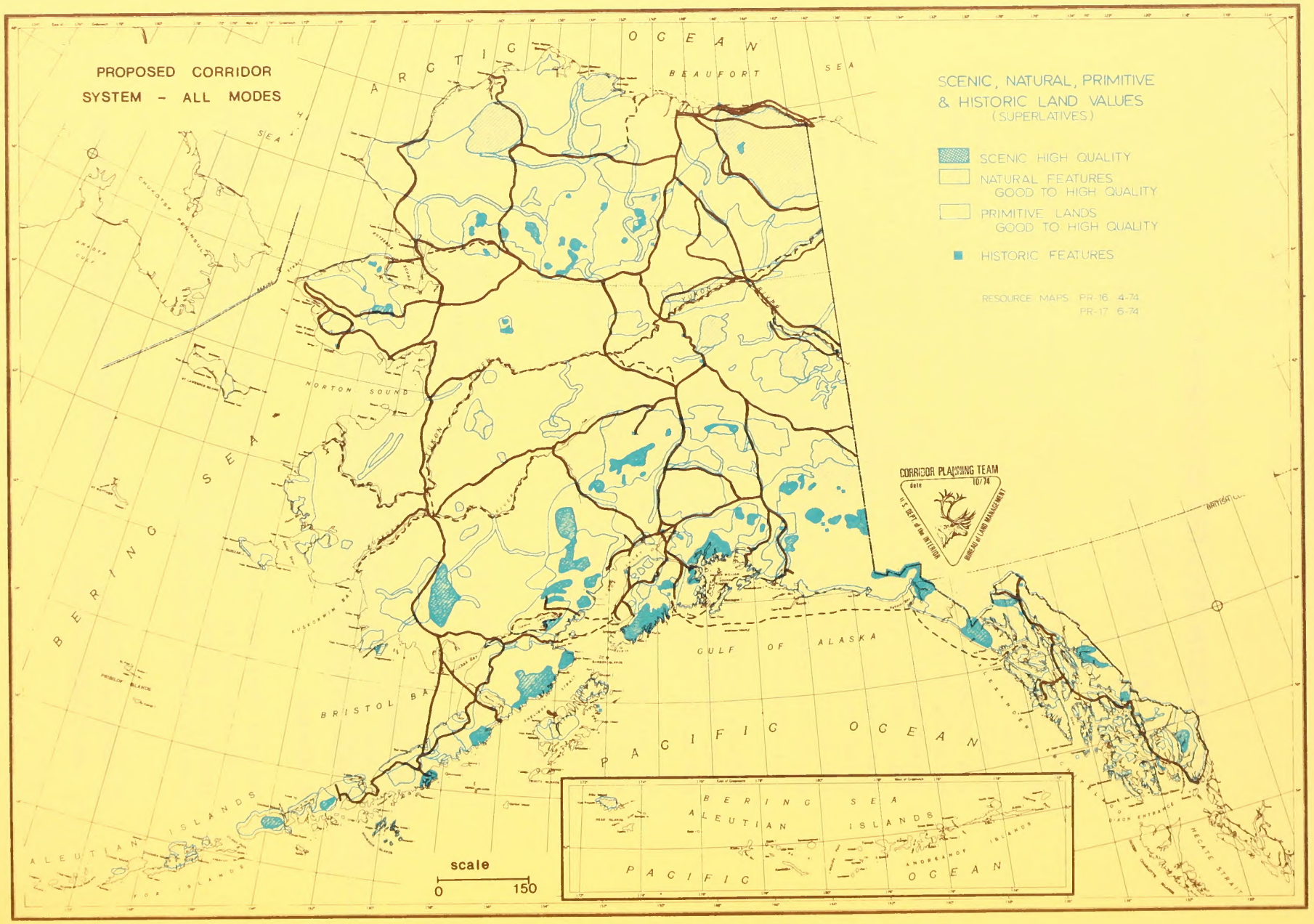
A. Scenic

Scenic areas include a variety of visual aspects pleasing to the eye. These often include parts of mountain ranges, water features such as snow, ice, rivers, lakes and fiords. Large areas of similar terrain usually are not included. Foregrounds have been included to enhance opportunities for viewing and protection of the primary features. Landform, color, water, vegetation and uniqueness are important factors.

B. Natural

Natural features include unique geological, botanical and zoological areas. Natural free-flowing rivers with primitive qualities provide a sampling of the most significant fresh water-related features which are unique to Alaska.

1/ Richard Tussing, 1973, The National Park System in Alaska - An Economic Study.


PROPOSED CORRIDOR SYSTEM - ALL MODES
SCENIC, NATURAL, PRIMITIVE & HISTORIC LAND VALUES (SUPERLATIVES)
SCENIC HIGH QUALITY
NATURAL FEATURES GOOD TO HIGH QUALITY
PRIMITIVE LANDS GOOD TO HIGH QUALITY
HISTORIC FEATURES
RESOURCE MAPS PR-16 4-74
PR-17 6-74
CORRIDOR PLANNING TEAM
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GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
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C. Historic

Historic sites are located throughout the State, but the Southeast contains a large number of sites connected with the early exploration and settlement of Alaska as well as the Gold Rush Era.

D. Primitive

Primitive lands are found mostly in the higher mountain ranges and along the Arctic Coast where there is potential to establish an excellent system of primitive areas having a variety of ecosystems. In the conterminous United States, it has been necessary to establish primitive areas from "left overs" which were generally those isolated places where there had been no good reason for intensive land use. In Alaska there is the opportunity to design a system based upon choice rather than "left overs".

E. Locations Criteria

1. Avoidance and Serving Considerations.

The inherent public values of recreation-related resources are often enhanced with improved accessibility. Conversely these same public values can be degraded with too much, or improper access location.

(a) Scenic, natural areas and historic sites.

These areas are usually relatively small in size. The Primary Corridor System can be designed to avoid such areas while still providing access to the general vicinity.

(b) Primitive lands.

These areas are both small and large. It is impossible to avoid all large areas, whereas, many of the smaller areas can be. Larger primitive areas, even if bisected by a corridor, may still retain a sufficient area, though sometimes considerably reduced, for possible primitive designation. Improved access to the perimeter of primitive areas facilitates both people use and people management.

(c) Socio-economic Aspects.

> The growth of the tourism-recreation industry in Alaska has continued to expand despite many drawbacks. The basic natural features which attract the tourist to Alaska are: scenery, natural features, historic and primitive values. A survey of visitors to Alaska in 1963 by Arthur D. Little indicates that the prime reasons for wanting to visit Alaska include: scenery and wilderness - 75%; a vacation in the wild, uncrowded outdoors - 44%; chance to travel along the Alaska Highway - 36%; idea of traveling north of the Arctic circle - 16%; adventure of the "Last Frontier" - 34%.

The Alaska State-wide Comprehensive Outdoor Recreation Plan indicates the need for additional access as follows:

> The provision of additional and improved access to more of Alaska's vast land area is seen by many as the most fundamental recreational need, for it is ironic that the nation's largest state, with such an abundance of recreational resources and a small population, should frequently experience crowding into areas and facilities similar to the more densely populated states. Facilities are needed to provide new access routes by land, water, and air . . .
>
> Development of roads as a means of recreation access will be successful only where commercial and recreational activities are compatible, or where zoning is used to separate incompatible land uses. Outdoor recreation needs should be considered in the location and design of all new highways, so that, along with other uses, the roads can give the hunter or fisherman access to good game and fishing areas and provide protected scenic rivers for the pleasure driver.

The type and extent of future use of Alaskan recreational resources are directly related to accessibility. The primitive quality of land may be destroyed or seriously impaired by highway or other surface facility development; however, access to the fringes of areas provides significant opportunity for a larger segment of the population to enjoy Alaska's bush country.

Historic sites, such as the Sitka National Monument, are the central attraction for an area and thus the visitations can be directly attributed to their presence.

MAJOR FISHERIES CONSIDERATIONS

Alaskan fisheries are used for commercial, sport and subsistence purposes.

Probably the highest quality fish production area in the State is Bristol Bay for both the commercial and sports use. This includes the drainages from Port Moller on the Alaska Peninsula to Cape Newenham. Two other high quality fishery areas in the State are the Copper River drainage of Prince William Sound above Woods Canyon, and Kodiak Island. The next most important areas would be Cook Inlet and Southeast Alaska. The fifth area involves several major drainages of the Kotzebue Sound.

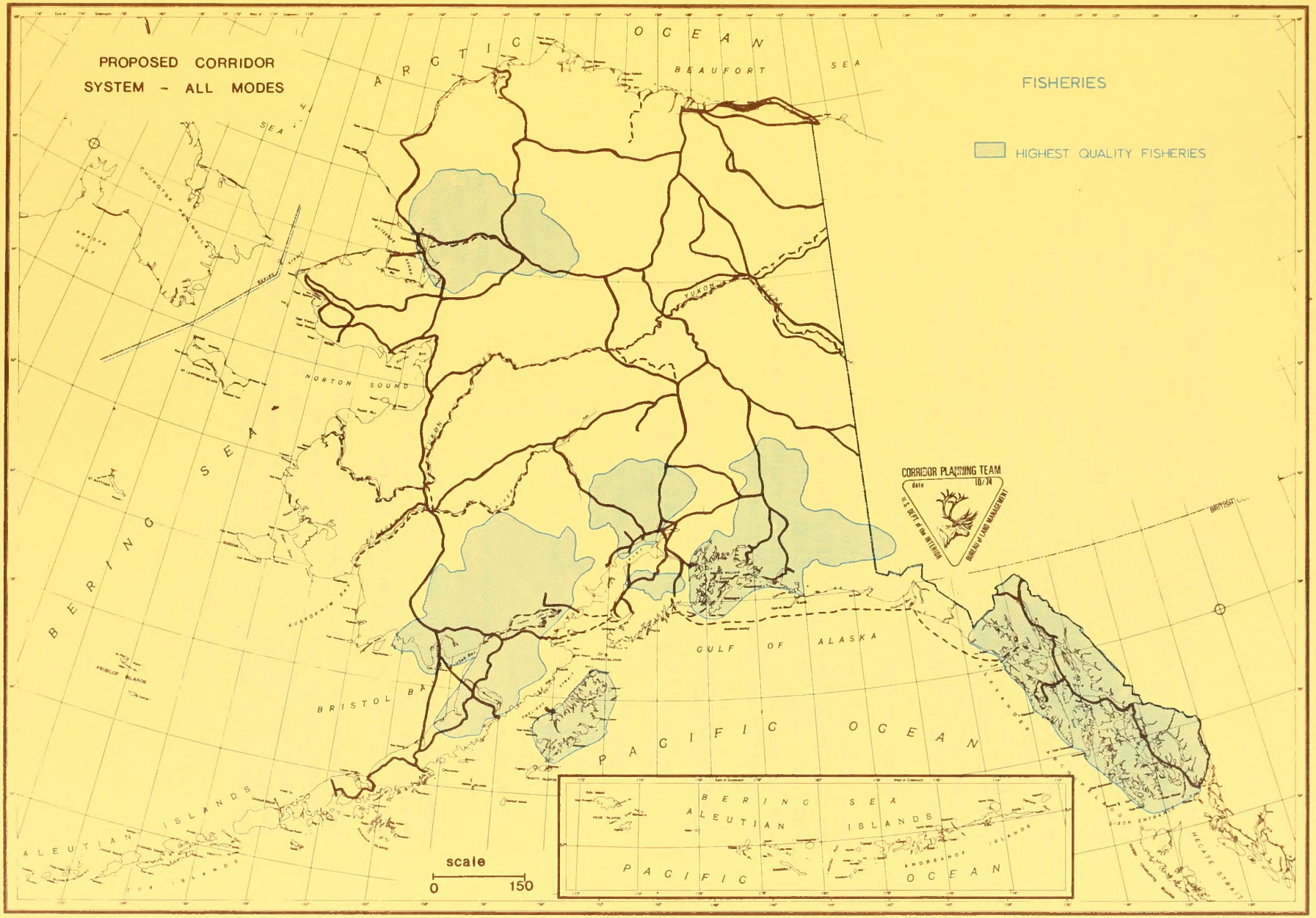
Five species of salmon - - king, silver, red, pink and chum -- are found in Alaska. Other anadromous fish are the Dolly Varden, Arctic char, steelhead trout, and cutthroat trout. Locally sheefish and some species of whitefish are also anadromous. Important freshwater fish are Arctic grayling, rainbow, lake trout, burbot and northern pike.

A. Avoidance Considerations

Man-made barriers stopping fish migration would eliminate any anadromous fishery dependent upon spawning areas upstream from the barrier. Partial barriers also can have a significant effect on the spawning success of anadromous fish since each individual normally has just enough strength to find its spawning grounds.

Spillage of oil or chemicals, or activity that alters the chemical or physical characteristics of the natural waters or gravel spawning beds, could be detrimental to the fish. Diversions or alterations in natural stream channels could likewise affect existing fisheries.

Change in water temperature can have an effect on incubating salmon eggs: an increase in temperature shortens the time of egg incubation and the resultant young fish will not be keyed to the necessary fish food production in their nursery waters.


PROPOSED CORRIDOR
SYSTEM - ALL MODES
FISHERIES
HIGHEST QUALITY FISHERIES
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
BERING SEA
NORTON SOUND
BRISTOL BAY
GULF OF ALASKA
PACIFIC OCEAN
ALEUTIAN ISLANDS
YUKON
CORRIDOR PLANNING TEAM
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A special Alaska statute regulates oil and gas lease development in the Bristol Bay because of the importance of the fishery. This law (Sec. 38.05.140(f)) states: "the submerged and shore land lying north of 57 degrees, 30' north latitude and east of 159 degrees, 49' west longitude within Bristol Bay drainage are designated as the Bristol Bay Fisheries Reserve. Within the Bristol Bay Fisheries Reserve no surface entry permit to develop an oil or gas lease may be issued on state owned or controlled land until the legislature by appropriate resolution specifically finds that the entry will not constitute danger to the fishery".

B. Socio-economic.

From 1965 to 1971 the value of Alaska's commercial fish to fisherman has ranged from $47.8 to $97.5 million. This includes salmon, bottom fish and shellfish. With the recent increase in market value the annual catch is possibly up to $100 million now.

ALASKAN COMMERCIAL FISHERIES ANNUAL VALUE OF HARVEST

Year	$ Value in Millions
1965	70.3
1966	80.7
1967	47.8
1968	79.1
1969	64.7
1970	97.5
1971	85.5

Sport fishing has an estimated worth of $20 million. No estimates were available for subsistence use, which would also be a substantial amount.

The suggested Primary Corridor System concentrates transportation and utilities modes into multimodal corridors, potentially providing better control of future developments with possible impacts on fisheries and improved access for sport fishing.

MAJOR WILDLIFE CONSIDERATIONS

Wildlife resources in Alaska should be both served and at times avoided by Primary Corridor designations. Serving generally means better public access to areas where wildlife resources may be underutilized or where more intensive management is needed. Opportunities for viewing and photographing, a nonconsumptive use, will be improved with better access.

Key wildlife habitat areas (such as calving or bear denning areas) are to be avoided wherever possible. When no apparent alternative routing around key wildlife habitat areas is available, wildlife resources will be lost or reduced without special treatment during the location, design and construction of transportation and utility facilities. In all cases intensive management after construction is assumed. These values, both plus and minus, have been considered in the suggested Primary Corridor System.

A major concern with expanded or improved transportation into or near wildlife areas is that more people impact this area. Recent actions by the State of Alaska wherein all sports hunting and fishing was closed on five miles on either side of the highway being constructed north of the Yukon River along the Trans-Alaska oil pipeline clearly show that these problems can be solved with intensive management.

Of more serious concern is the compartmentalization of Alaska into areas bounded by roads, rail, pipelines or similar lineral facilities of man. Such actions can have serious effect on the migratory habits of the wide ranging caribou as well as disturbance of the ranges of the brown/grizzly bear and wolf and their predator-prey relationships with their natural ecosystem.

The economic value of wildlife to the State is estimated at $13.2 million annually. This is generated through use of Alaskan wildlife resources for sport hunting, trapping, subsistence, viewing, photographing, and nature appreciation. Subsistence use values for this report are based on an implicit value of meat, hide, and by-products at $1.29 per pound.

Major references for this section are analysis papers prepared by the Joint Federal-State Land Use Planning Commission and the Alaska Department of Fish and Game.

A. Barren Ground Caribou

There are 13 major caribou herds in Alaska.

Caribou movements, though unpredictable, involve annual, long distance migrations. Major concerns are focused upon movements between their calving grounds and summer breeding/fall and winter ranges.

1. Avoidance Considerations.

In relation to corridor designations there are at least two factors that are considered critical to caribou survival: calving areas, which are the focal point of a herd's total range; and migration routes between seasonal ranges and the calving grounds. Structures or physical barriers which invade calving areas, and/or stop or substantially change historic migration routes have been given prime consideration in the location of the Primary Corridor System.

Location of calving areas may change from year to year, but those of the larger herds have tended to be well established. Disturbances in the calving areas during late May and early June should be avoided.

2. Socio-Economic.

The Arctic, Porcupine, Alaska Peninsula and Mulchatna caribou herds could all probably sustain greater harvest without endangering present population levels. Primary Corridors which have modes to move people or commodities would assist in the management and increase harvest of these herds.

The socio-economic value of Alaskan caribou is generated through caribou use for sport hunting, subsistence, viewing, photographing and nature appreciation. Sport hunting generates approximately $5 million annually, of which about $2.5 million benefits the Alaskan economy directly. The current subsistence harvest is valued at $4 million annually.

B. Moose

Moose are distributed over most of Alaska except for the Kodiak and Aleutian Island groups. Their annual habitat requirements are extremely broad but includes the following: breeding grounds, winter feeding areas, calving grounds and summer feeding areas.

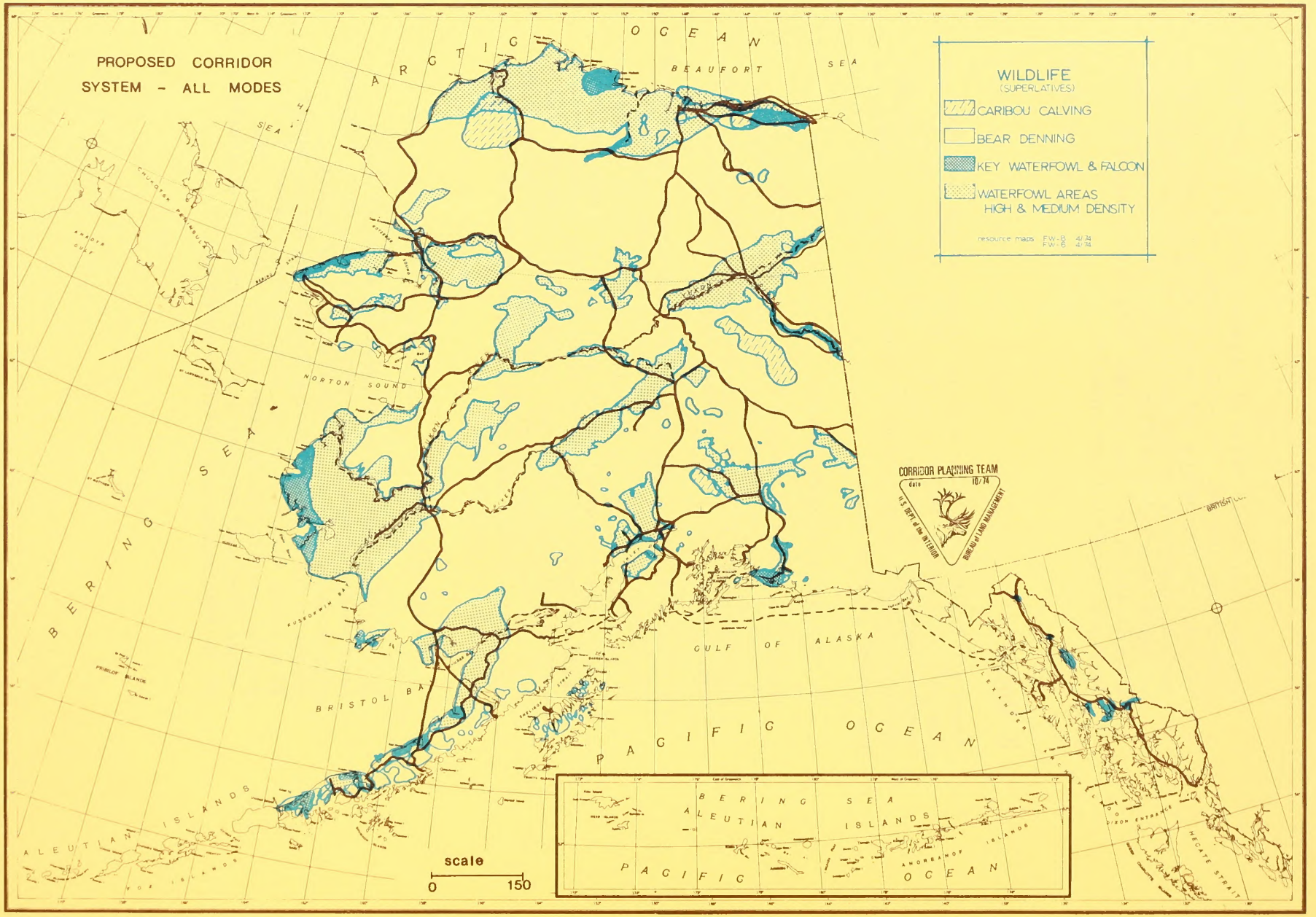
1. Avoidance Considerations.

Moose are widely dispersed over the countryside, utilize a wide range of habitats at different times of the year, and are quite adaptable to changing conditions making it difficult to define areas to be avoided.

A major concern is the statewide human-moose conflict which results in hundreds of moose killed by cars and trains. It is believed that "auto-kills" will increase proportionally to the increased number and miles of roads and/or railroads and the volume of traffic. The number of moose so killed is also in direct proportion to the depth of snow and the number of miles of right-of-way maintained during the winter since moose follow the roads where less snow makes travel easier.

2. Socio-economic.

The socio-economic value of Alaskan moose relates essentially to use of the moose for meat, sport hunting, subsistence, viewing, photographing, and nature appreciation. Sport hunting guarantees approximately $3 million annually to the State of which about $1.5 million benefit the Alaskan economy directly. The subsistence take of meat and by-products is estimated to be approximately $1 million annually.


PROPOSED CORRIDOR
SYSTEM - ALL MODES
WILDLIFE
(SUPERLATIVES)
CARIBOU CALVING
BEAR DENNING
KEY WATERFOWL & FALCON
WATERFOWL AREAS
HIGH & MEDIUM DENSITY
resource maps FW-B 4/74
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ALEUTIAN ISLANDS
PACIFIC OCEAN

C. Brown/Grizzly Bear

Alaska is known worldwide for its large brown bears. They are absent only from the Aleutian Islands beyond Unimak and from the islands south of Frederick Sound. The overall trend is an increasing sports demand for trophy brown bears.

1. Avoidance Considerations.

Two identified key habitat areas for the brown/grizzly bear are the denning areas and particularly the "concentration areas" along salmon streams in late summer and early fall. Extensions of transportation and utility corridors into key areas could cause a decrease in bear populations without careful planning and intensive management.

2. Socio-economic.

The socio-economic value of the brown/grizzly bear is essentially generated through sport hunting, minor amounts of subsistence hunting and viewing and photography.

In 1973, 61 percent of the reported 913 brown bears killed were taken by nonresident sport hunters.

Nonresidents spend between $2,500 and $3,500 in Alaska to get a bear. Residents spend as little as virtually nothing taking a bear incidental to hunting another animal, or as much as $2,500 or more for a regular guided hunt. About $2 million was spent for bear hunting in 1973 in Alaska.

D. Dall Sheep

Dall sheep inhabit parts of all major mountain ranges in Alaska, including the Kenai, Chugach, Wrangell, Talkeetna, Aleutian, Alaska and Brooks Ranges as well as the White Mountains and Tanana Hills.

Dall sheep rams carry spectacular horns and are one of the most desired sport hunting trophies in North America.

1. Avoidance Considerations.

Areas of key habitat important to Dall sheep are mineral licks and lambing grounds.

The proposed Primary Corridor System is located at lower elevations and therefore should have only relatively small impact on sheep populations.

2. Socio-economic.

To maximize the potential sport harvest of Dall sheep, an access system (not necessarily roads) to remote habitat coupled with intensive regulation of the harvest is needed.

The economic value of Alaskan sheep is essentially use of sheep for sport hunting, viewing, photographing and nature appreciation. Sport hunting generates approximately $1.8 million of expenditures annually of which about $.9 million benefits the Alaskan economy directly.

E. Polar Bear and Marine Mammals

The Alaskan polar bear population is concentrated in the Bering Sea/Chukchi Sea area and along the north Arctic coast. During the period 1940 to 1972, sport hunting of polar bear was a growing trend, which ended by passage of the Federal Marine Mammals Protection Act.

Pacific walrus, steller sea lion, sea otter and several varieties of seals inhabit the off shore waters of Alaska. Hunting of seals for fur was common prior to the Alaska Purchase and continued until the above Protection Act curtailed the harvest.

1. Avoidance Considerations.

As marine mammals tend to remain on sea ice or in the sea itself, the proposed Primary Corridor System will have relatively little impact. Polar bears den along the coast and at island sites. Consequently impacts could be substantial at specific locations where these sites are located.

Areas of key habitat for polar bear in Alaska include known denning areas east of the Colville River delta along the Beaufort Seacoast, except for the northern fur seals on Pribilof Island rookeries, none are far from Primary Corridors.

2. Socio-Economic.

No sport hunting revenues have been derived from sea mammals since 1972. Subsistence use is low, and limited to coastal areas largely north of the Arctic Circle. These areas are characterized by small numbers of native people whose use of the marine mammal resource probably has little effect on the overall numbers of animals.

Location of corridors for certain modes of transportation in these coastal areas could conceivably allow better access for subsistence hunting, nature appreciation and scenic beauty. Whether associated increases in man's activity related to the corridors would cause any disturbance of the marine mammals environment is unknown but would be studied prior to corridor construction.

F. Waterfowl

The Alaskan waterfowl resource is composed of some 41 species of ducks, 13 species and subspecies of geese and 3 species of swans. Estimated fall flight from Alaska include 10,224,000 ducks, 1,145,000 geese and 73,600 swans.

1. Avoidance Considerations.

Alterations or modifications of waterfowl habitat in either minor (e.g., road across a marsh) or major (e.g., large dam flooding important habitat) ways will affect Alaska's existing waterfowl resources.

In some areas of Alaska, waterfowl nesting densities are very concentrated and therefore the Primary Corridor System has attempted to avoid such areas. Disturbances in these areas during the peak nesting period could significantly affect waterfowl production.

Oil or slurry pipeline spills at certain times of the year could kill up to hundreds of thousands of waterfowl and other birds. The seriousness of waterfowl impacts would depend upon the extent of spill, type of spill, location and whether it is on land, near shore, or offshore.

2. Socio-Economic.

Based on duck stamps sold, gross annual expenditures in Alaska amounts to approximately $1 million.

Waterfowl from Alaskan nesting areas account for approximately 20 percent of the total United States sport harvest. Almost all of these 2.7 million birds are taken in places other than Alaska. It is estimated that $25.8 million is spent by hunters attempting to harvest Alaskan migratory waterfowl.

In addition to hunting revenues, subsistence use of waterfowl in parts of Alaska is substantial. An implicit value of this subsistence use is $274,000 per year.

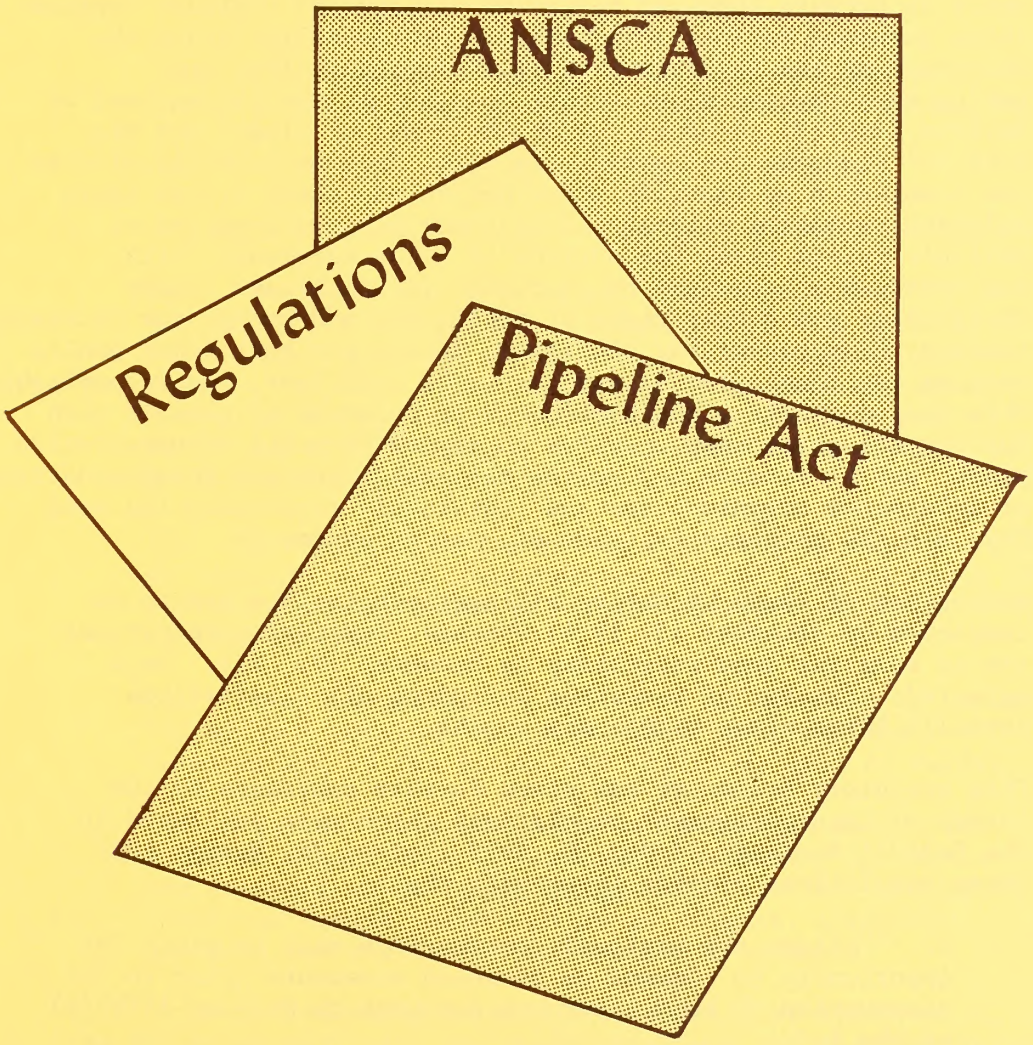
G. Peregrine Falcons, Hawks and Eagles

Several major areas of the state are noted for their importance for nesting sites for the peregrine falcon (an endangered species), hawks and eagles. Especially important from the standpoint of major nesting concentration areas are the upper Yukon, Porcupine and Colville Rivers. The suggested location of the Primary Corridor System seeks to avoid such areas.

Laws & Regulations

APPENDIX I:

Summary of Major Statutory and Regulatory Framework for Identification of a Primary Corridor System



SUMMARY OF MAJOR STATUTORY AND REGULATORY FRAMEWORK IN IDENTIFICATION OF A PRIMARY CORRIDOR SYSTEM

A. Federal

1. Alaska Native Claims Settlement Act (P.L. 92-203).

Section 17(b) of the Alaska Native Claims Settlement Act is the primary authority for the reservation of public easements in patents conveyed to Native village and regional corporations pursuant to this legislation. Section 17(b) vests the Secretary of the Interior with final responsibility for making such reservations. Prior to doing so, he is required by Section 17(b)(3) to consult with the State of Alaska and the Land Use Planning Commission. In turn, Section 17(b)(1) directs the Commission to identify those public easements across lands selected by Native village and regional corporations and at periodic points along the courses of major waterways which are reasonably necessary to guarantee international treaty obligations and a full right of public use and access for recreation, hunting, transportation, utilities, docks, and such other public uses as the Commission determines to be important. In accomplishing this responsibility, the Commission is required to consult with appropriate government agencies to review proposed transportation plans, and to receive and review the statements and recommendations of interested organizations and individuals concerning the need for, and the proposed location of, needed easements.

Selections of lands by Native village corporations are to be completed by December 18, 1974; whereas, regional corporations are to complete land selections by December 18, 1975. Once selected, transfer of ownership including all reservations normally takes place within six months.

This statutory framework was given further substance by the Bureau of Land Management regulations which were published in the Federal Register of May 30, 1973 (Volume 38, Number 103). These regulations provide inter alia that:

a. Village and regional corporations must be given the opportunity to comment on proposed easements prior to the reservation of such interests pursuant to Section 17(b)(3) of the Act.

b. Upon the request of the appropriate Native grantee, the Secretary of the Interior must provide written justification for any easements which he has decided to reserve.

c. Public easements will be reserved only if they are specific as to use, location, and size. In addition, these elements must be reasonably related to an anticipated public use or to a planned or existing governmental function.

d. No easements will be reserved in such a manner as to:

(1) Deprive the grantee without its consent of reasonable access to bodies of water or to highways in, or bordering upon, the land which is to be conveyed.

(2) Constitute a so-called "scenic easement."

e. All easements will be subject to the following conditions:

(1) The Secretary will terminate an easement if it is not used for the purpose intended by the date specified in the conveyance or, if no deadline is provided, by December 18, 2001. An easement will be vacated sooner if the Secretary finds that conditions are such that retention of the easement is no longer required for a public use or governmental function.

(2) The Native grantee or its successor in interest will be entitled to just compensation for the loss of value of any improvements existing within the easement on the date of reservation.

(3) Upon the definite location of an easement or easements for which a corridor was previously reserved, the reservation, to the extent not utilized, will be voided.

(4) Corridor locations will be no more extensive in width or length than is reasonably necessary to locate any easement which is to be reserved. In determining width and length, such factors as climate, topography, terrain, and available data will be considered.

f. Prior to reserving easements in particular conveyances, the Secretary will give the State of Alaska and the Commission 90 days after notice in which to make any easement recommendations which they might have.

2. Mineral Leasing Act of 1920, Amendments and Trans-Alaska Oil Pipeline Authorization (P.L. 93-153).

a. Title I further amends Section 28 of the Mineral Leasing Act of 1920, as amended. It contains the following provisions pertinent to identification and location of a Primary Corridor System:

(1) Federal lands are defined as all lands owned by the United Statesexcept lands in the National Park System, lands held in trust for an Indian or Indian tribe, and lands of the Outer Continental Shelf

(2) The provisions of the National Environmental Policy Act of 1969 (P.L. 91-190) are to be applied without exception or modification to applications for Federal permits where there may be significant impacts on the environment. Applications are to include a plan of construction, operation and rehabilitation.

(3) Joint use of rights-of-way in common are required to the extent practical to minimize adverse environmental impacts and the proliferation of separate rights-of-way across Federal lands. To implement this concept, the Secretary of the Interior or other Federal official reserves the right to grant additional rights-of-way or permits for compatible uses on or adjacent to rights-of-way approved after November 16, 1973.

(4) The Secretary of the Interior is directed, in consultation with other Federal and State agencies, to review the need for a national system of transportation and utility corridors across Federal lands as a means to minimize adverse environmental impacts and prevent the proliferation of separate rights-of-way. A report to the President and the Congress presenting the findings and recommendations of this review is to be completed by July 1, 1975.

b. Title II authorizes construction of the trans-Alaska oil pipeline. In addition, this section states the Congressional finding that a supplemental pipeline from the North Slope of Alaska to the conterminous United States through Canada may be needed and should be studied now.

c. Title III authorizes and requests the President to negotiate with the Government of Canada to determine among other things:

(1) The willingness of the Government of Canada to permit construction of pipelines or other transport systems across Canada for the transport of Alaskan oil and gas, including tankers by way of the Northwest Passage.

(2) Terms and conditions for construction of such pipelines or transport systems.

(3) The desirability of undertaking joint studies and investigations designed to insure protection of the environment, reduce legal and regulatory uncertainty, and insure that the respective energy requirements of the people of Canada and of the United States are adequately met.

(4) The feasibility, consistent with needs of other areas of the United States, of acquiring additional energy from other sources so that shipment of oil from the trans-Alaska oil pipeline into the Puget Sound area would be unneccessary.

This Title also authorizes and directs the secretary of the Interior to investigate the feasibility of one or more oil and gas pipelines from the North Slope of Alaska through Canada. The final report is to be submitted by November 16, 1975.

3. 43 United States Code.

a. § 305 provides:

In all patents for land taken up, entered, or located in Alaska after March 12, 1914, there shall be expressed that there is reserved to the United States a right-of-way for the construction of railroads, telegraph and telephone lines to the extent of one hundred feet on either side of the center line of any such road and twenty-five feet on either side of the center line of any such telegraph or telephone lines.

b. § 945. Reservation in patents of right-of-way ditches or canals:

In all patents for lands taken up after August 30, 1890, under any of the land laws of the United States or on entries or claims validated by the Act of August 30, 1890 west of the one-hundredty meridian, it shall be expressed that there is reserved from the lands in said patent described a right-of-way thereon for ditches or canals constructed by the authority of the United States. August 30, 1890, c. 837, § 1, 26 Stat. 391.

c. § 932. Right-of-way for highways (R.S. 2477):

The right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted.

The regulations relating to this statute are found in 43 CFR 2234.2-5, and read in part as follows:

> "(1) Grants of rights-of-way referred to in the preceding section become effective upon the construction or establishment of highways, in accordance with the State laws, over public lands, not reserved for public uses. No application should be filed under R.S. 2477 as no action on the part of the Government is necessary. Rights-of-way granted by R.S. 2477 do not include rights-of-way for facilities with respect to which any other provision of law specifically requires the filing of an application for a right-of-way."

4. 44 L.D. 513.

44 L.D. 513 is an abbreviation that refers to a letter of instruction found in Volume 44, Land Decisions, p. 513. The date of this instruction is January 13, 1916. This instruction provides generally that where telephone lines, road, trails, bridges. cabins, fences, and similar improvements have been constructed on national resource lands and are being maintained and operated by and for the United States, and where the office in charge of Land Records is furnished with appropriate maps or field notes so that the improvements may be definitely located on the records, the lands needed for such improvements may be retained for the use of the United States through the insertion of a reservation in final certificates and subsequent patents. This reservation would read substantially as follows:

Subject, however, to that certain telephone line (or road, trail, etc.) and all appurtenances thereto, constructed by the United States, over, through or upon the land herein described, and the right of the United States, its officers, agents, or employees to maintain, operate, repair, or improve, the same so long as needed or used for or by the United States.

Instructions to the General Land Office in 1916 (44 L.D. 513) extended the principle of appropriation of land to public use and purpose as it applies to actual construction to cover areas in which the evidence (such as staking the ground) shows that construction has been provided for and will be immediately undertaken.

5. E.O. 10355 (May 26, 1952).

Broad executive authority has been delegated to the Secretary of the Interior by Executive Order 9146 (April 24, 1942) and Executive Order 9337 (April 24, 1952) to withdraw by Executive Order, portions of the public domain from disposal under the public land laws and to reserve them for public use to serve the public interest of the Nation. Executive Order 10355 removed the requirement that withdrawal orders be cleared through the Bureau of the Budget and the Attorney General and specified that all withdrawals under this authority be done as "public land orders." This provision was used in the reservation of the utility corridor for the trans-Alaska oil pipeline and a similar corridor along the west and south edge of the Arctic Wildlife Range. Lands so withdrawn are not available for selection by Alaskan Native village or regional corporations or by the State of Alaska.

B. Constitution of the State of Alaska.

Various legal and policy questions arise out of the reservation of public easements to and along bodies of water, including coastal waters, rivers, lakes, and streams. With this in mind, reference is made to the following authorities:

1. Article VIII (Natural Resources).

Section 3, Common Use, Wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use.

Section 13, Water Rights. All surface and subsurface waters reserved to the people for common use, except mineral and medicinal waters, are subject to appropriation. Priority of appropriation shall give prior right....

Section 14, Access to Navigable Waters. Free access to the navigable or public waters of the State, as defined by the legislature, shall not be denied any citizen of the United States or resident of the State, except that the legislature may by general law regulate and limit such access for other beneficial uses or public purposes.

Section 15, No Exclusive Rights of Fishery. No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the State.

Section 16, Protection of Rights. No person shall be involuntarily divested of his right to the use of waters, his interests in lands, or improvements affecting either, except for a superior beneficial use or public purpose and then only with just compensation and by operation of law.

The portions of Arcticle VIII quoted above are partially implemented in the Alaska Water Use Act (AS 46.15.010, et seq.) This legislation provides in relevant part:

> Wherever occurring in a natural state, the waters are reserved to the people for common use and are subject to appropriation and beneficial use as provided in this chapter. (AS 46.15.030).

C. Alaska Statutes

1. Alaska Statute 09.55.240. Uses for which authorized: rights-of-way.

> (a) The right of eminent domain may be exercised for the following public uses:
>
> * * * *
>
> (6) private roads leading from highways to residences, mines, or farms;
>
> * * * *

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2. Alaska Statute 19.05.080, Dedication of land, rights-of-way, and materials by purchase of eminent domain.

The department (of Highways) on behalf of the State and as part of the cost of constructing or maintaining a highway may purchase, acquire, take over, or condemn under the right and power of eminent domain, land in fee simple or easements which it considers necessary for present public use, either temporary and reasonable for the public use. By the same means, the department may obtain material, including access to it....

3. Alaska Statute 19.10.010, Dedication of land for public highways.

A tract 100 feet wide between each section of land owned by the state, or acquired from the state, and a tract four rods wide between all other sections in the state, is dedicated for use as public highways. The section line is the center of the dedicated right-of-way to the strip inures to the ow formed a part by the original

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As the Nation's principal conservation agency the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources."

The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States--now and in the future.